

PHILADELPHIA REGION INPUT-OUTPUT STUDY

WORKING PAPERS

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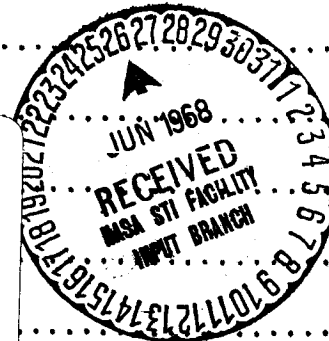
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PHILADELPHIA REGION

INPUT-OUTPUT

STUDY

by

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Introduction

The Philadelphia Region Input-Output Study represents an attempt to provide a more rigorous and scientific basis for regional economic impact analysis. At the time the study was initiated there existed considerable concern among government agencies and the business community regarding the possible undesirable effects of major changes in federal programs and expenditure patterns. For example, there was much concern regarding the impacts of major government facilities upon the communities, both large and small, within which they were located. Similar concern was expressed with reference to possible adverse effects of major changes in the level and/or composition of military expenditures consequent to disarmament. As one of the several possible channels of investigation, the project director and his associates decided to conduct a highly detailed input-output study of the Philadelphia region ... thereby to make available basic disaggregated data with which to investigate the repercussions of diverse changes in federal programs and expenditure patterns.

Time passes and so change the pressing problems of the day. The problems which led to the initiation of this three year study are no longer as pressing as they once were. In their stead, however, there are new problems; and in the search for solutions to these new problems, the input-output study is equally useful. Solutions to these new problems include the design of new communities (new towns), the rehabilitation (renewal) of existing older urban complexes, the provision of adequate employment opportunities for combating the problems of poverty and its associated ills, the control of forces detrimental to the physical environment.

Certain, too, is that tomorrow will pose still another set of critical problems. In all probability, to these problems the study framework can also be usefully applied.

Beyond assistance in the search for solutions to basic problems, this study should provide, it is hoped, a major contribution to the standardization of procedures for developing regional accounts and input-output coefficients. By so doing it should make possible major economies in the construction of regional accounts and input-output tables for both metropolitan and non-metropolitan regions.⁽¹⁾

The research for this study was undertaken by the Department of Regional Science, Wharton School of Finance and Commerce, University of Pennsylvania under a grant from the National Aeronautics and Space Administration.⁽²⁾ The study was initiated in September 1962 under the direction of Walter Isard, in close association with Thomas W. Langford, Jr. and Eliahu Romanoff. At the early stages, Gerald J. Karaska contributed a major way. Willis J. Winn, Dean of the Wharton School generously made available the full facilities of the School. Sylvia Persky graciously handled the innumerable administrative problems. There were of course many others who assisted in the study, and whose help will be acknowledged in the final report.

We wish to emphasize the major reason for the presentation of the table and related procedures at this time when all of the errors and discrepancies have not been eliminated and at a later time when only

⁽¹⁾ Work along these lines is already being conducted by the Regional Input-Output Committee (Professor W. Leontief, Chairman; W. Isard, Secretary) of the Regional Science Research Institute.

⁽²⁾ NASA - Research Grant Number NsG-497-39-010-004.

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some of these will be eliminated. We hope that others can profit greatly from our mistakes. It is widely recognized that large scale empirical research, such as that involved in census taking and tabulation, input-output analysis, and construction of regional accounts cannot avoid errors, and at times serious errors. It is also widely recognized that government agencies, by and large have been the major producers of these large scale empirical studies, because usually they alone have had the necessary resources. Unfortunately these government agencies have not been free to reveal the multitude of questionable procedures which must be employed in these studies. Nor have they been free to be frank on the related data inadequacies. Because this particular study has had the good fortune to be conducted at a major University, we are in a position to reveal in full, as recorded in the chapters to follow, the inadequacies of our procedures and data without the need for apology or concern for research legitimacy. However, we also wish to underline two major contributions of the study at this stage. One, we have derived the major input coefficients and control totals, whose accuracy we feel is of a rather high order. (The most serious errors relate to the coefficients of smaller magnitude.) Two, we have set forth in a systematic manner all the procedures employed in the study so that others can gain a full understanding and comprehensive view of what is involved in such a study.

January 1967

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Chapter 1

COLLECTION OF DATA: MINING, CONSTRUCTION, and MANUFACTURING

The procedures for securing information for the mining, construction and manufacturing industries of the Philadelphia region input-output study are described in this Chapter. However, prior to a presentation of the survey methods employed, a short description of the Philadelphia metropolitan region is in order to outline the nature of the region, its position relative to other large metropolitan areas, and its internal composition.

The Philadelphia Metropolitan Region

The Philadelphia Metropolitan Region was one of the first urban regions to develop in this country. It contains one of the oldest cities in the United States, Philadelphia, and includes other early settlements which have contributed to the advanced urbanization of the area. With the growth of the country and its own development over the years, the region has become a highly diversified area where almost all kinds of enterprise known to exist in advanced metropolitan regions are represented. This characteristic makes it an ideal laboratory in which new and improved methods of regional analyses can be applied and evaluated. The large size of the region is particularly important for a detailed inter-industry study. Its size makes it possible to disaggregate economic activity into many sectors from most of which a

satisfactory sample can be obtained. The region studied is the Philadelphia, Pennsylvania-New Jersey Standard Metropolitan Statistical Area, as defined by the U.S. Bureau of the Budget.⁽¹⁾ It consists of Philadelphia and seven other surrounding counties. The region includes five counties in the Commonwealth of Pennsylvania and three in the State of New Jersey; it straddles the Delaware River, which forms the boundary between the two States. Bureau of the Budget's definition of the metropolitan region is satisfactory for the construction of an input-output table.⁽²⁾ The area thus defined contains a nodal region, where activities tend to cluster in and around the central city, and provides a large enough base with sufficient interdependence in its structure to permit meaningful examination of the impacts of diverse exogenous forces. Moreover, because fairly extensive data are reported for the Philadelphia SMSA, the data requirements for the construction of this regional study can be effectively met at an SMSA level.

Unlike the definition chosen by the Penn Jersey Transportation Study, our definition excludes the Trenton, New Jersey SMSA to the north, and the Wilmington, Delaware-New Jersey SMSA to the south.

The relative importance of the Philadelphia region in the national economy can be seen from Table 1-1, which ranks the population of the ten largest Standard Metropolitan Statistical Areas as of 1960.

(1) U.S. Bureau of the Budget, Standard Metropolitan Statistical Areas, 1960 (Washington, D.C.: U.S. Government Printing Office, 1961).

(2) Walter Isard, et al. Methods of Regional Science (New York: The Technology Press and John Wiley and Sons, Inc., 1960) pp. 322-324; Walter Isard, "Regional Science, the Concept of Region and Regional Structure," Papers and Proceedings of the Regional Science Association, Vol. II (1956), pp. 13-26; and, Michael B. Teitz, "Regional Theory and Regional Models," Papers and Proceedings of the Regional Science Association, Vol. IX (1962), pp. 35-50.

Table 1 - 1

POPULATION OF THE TEN LARGEST METROPOLITAN REGIONS, 1960

SMSA	Population (000)	Percent of U.S. Popu- lation
New York - N.Y. New Jersey ⁽¹⁾	14,759	8.1
Chicago - N.W. Indiana ⁽¹⁾	6,794	3.7
Los Angeles - Long Beach, California	6,743	3.6
PHILADELPHIA, PA. - N. J.	4,343	2.4
Detroit, Michigan	3,762	2.0
San Francisco - Oakland, California	2,783	1.6
Boston, Massachusetts	2,589	1.4
Pittsburgh, Pennsylvania	2,405	1.3
St. Louis, Missouri - Illinois	2,060	1.1
Washington, D.C. - Maryland - Va.	2,001	1.0

The changes in the distribution of population within the Philadelphia SMSA during the 1950-1960 period can be seen in Table 1 - 2. This table shows that the region has experienced, as most metropolitan areas, a declining population in the central city and a growing suburban population. A more detailed description of the growth of the region, particularly as influenced by the development of the transportation network, can be found in a recent publication of the Penn Jersey Transportation Study.

(1) Standard Consolidated Area. Source: Bureau of the Budget, Standard Metropolitan Statistical Areas, 1960 Washington, D.C., U.S. Government Printing Office, 1961.

(2) Penn Jersey Transportation Study, The State of the Region, P.J. Re-
Vol. 1

Table 1 - 2

CHANGES IN POPULATION DISTRIBUTION BY COUNTY
PHILADELPHIA, PA.-NEW JERSEY SMSA, 1950-1960

County	Population in Thousands		Percent Change	
	1950	1960	1950	1960
Bucks	145	309	113.4	
Chester	159	211	32.3	
Delaware	414	553	33.5	
Montgomery	353	517	46.3	
Philadelphia	2,072	2,003	-3.3	
Pa. Part	3,143	3,592	14.3	
Burlington	136	224	65.2	
Camden	301	392	30.4	
Gloucester	92	135	47.0	
N.J. Part	528	751	42.2	
Philadelphia SMSA	3,671	4,343	25.1	

Detail may not add to total due to rounding.(1)

The share of the five Pennsylvania counties in the region's population has continued to decline over the years. While in 1900 these counties accounted for 89.6 percent of the region's population, by 1920 their share had declined to 88.2 percent and by 1940 to 87.5 percent. During the 1950-1960 period the five counties' share (of the region's total) declined from 89.6 to 82.3 percent. This point is important to keep in mind since, due to the limited information on a disaggregated level for the New Jersey part of the region, data for the five Pennsylvania counties were used in estimating changes over time

(1)

Source: U.S. Bureau of Census, U.S. Census of Population: 1950 and 1960, Washington, D.C. U.S. Government Printing Office, 1962

for the region as a whole.⁽¹⁾

This portrayal of the region would not be complete without a brief preliminary description of its employment. Such is presented in Table 1 - 3 which summarizes the distribution of employment by place of residence in the eight counties of the SMSA, and in Table 1 - 4 which summarizes the total employment of the area's residents by major industry groups.

Finally, the breakdown of the estimated 1959 output of the private sectors of the Philadelphia SMSA by economic division is presented in Table 1 - 5. The composition of output of the region is also compared with that of the nation, for 1958 (see Table 1 - 6). Although there are minor discrepancies in the definitions of the sectors at this level of aggregation, and although the U.S. Data are for an earlier year, nonetheless the comparison is meaningful. It shows the differences one would expect to find between the nation and a metropolitan area.

General Survey Procedures

In order to conduct a regional input-output study it is necessary to collect extensive data from primary sources to supplement available published data. Two alternatives in data collection are possible:

- (1) a complete census of establishments can be undertaken, following the Kalamazoo example⁽²⁾ or
- (2) a sample of establishments by industry can be used. In the latter case, several survey designs are possible depending on the size of the region, the nature of the industries, and

(1) See Chapter 4 for discussion of methodology for estimating detailed control totals for the manufacturing and other producing industries.

(2) Werner Hochwald, Herbert E. Striner and Sidney Sonnenblum, Local Impact of Foreign Trade, Methodology for Developing Local Accounts Tables, Technical Supplement D, (Washington: National Planning Association, 1960).

TABLE 1-3
DISTRIBUTION OF POPULATION AND EMPLOYMENT BY COUNTY;
PHILADELPHIA, PA.-N.J. SMSA, 1960

	Persons (000)	Percent of Region	Employees (000)	Percent of Region
Bucks	309	7.1	110	6.7
Chester	211	4.3	78	4.7
Delaware	553	12.7	207	12.6
Montgomery	517	11.9	201	12.2
Philadelphia	2,003	46.1	789	47.9
Pa. Part	3,592	82.7	1,384	84.1
Burlington	224	5.2	66	4.0
Camden	392	9.0	146	8.9
Gloucester	135	3.1	49	3.0
N.J. Part	751	17.3	261	15.9
Philadelphia SMSA	4,343	100.0	1,645	100.0

Details may not add to total due to rounding.

Source: U.S. Bureau of the Census, U.S. Census of Population: 1960, General Social and Economic Characteristics, Pennsylvania and New Jersey, U.S. Government Printing Office, Washington, D.C., 1962.

TABLE 1-4
 EMPLOYMENT DISTRIBUTION BY ECONOMIC DIVISIONS
 PHILADELPHIA, PA.-N.J. SMSA, 1960

Economic Division	Employment (000)	Percent of Total
Agriculture, Forestry and Fisheries	20.2	1.2
Mining	1.8	0.1
Construction	82.8	5.0
Manufacturing	588.5	35.8
Transportation, Communications and Utilities	109.9	6.6
Wholesale and Retail Trade	291.3	17.7
Finance, Insurance and Real Estate	76.8	4.7
Services	319.0	19.4
Government	80.0	4.9
Not Classified	74.8	4.6
Total	1,645.1	100.0

Source: U.S. Bureau of the Census, U. S. Census of Population: 1960, General Social and Economic Characteristics, Pennsylvania and New Jersey, (Washington, D.C., U.S. Government Printing Office, 1962).

TABLE 1-5
ESTIMATED OUTPUT OF THE PRIVATE SECTORS BY
ECONOMIC DIVISION, PHILADELPHIA, PA.-N.J. SMSA, 1959

Economic Division	Output (\$000)	Percent of Total
Agric., Forestry & Fisheries	134,709	.59
Mining	30,922	.14
Contract Construction (incl. SIC 656)	1,771,985	7.80
Manufacturing	11,475,776	50.50
Ordnance (SIC 19)	16,411	.07
Manufacturing (SIC 20-39)	11,459,365	50.43
Transp. Communication & Util.	1,641,392	7.22
Transportation	775,765	3.41
Communication	370,937	1.63
Elec. Gas, & Sanit. Serv.	494,690	2.18
Wholesale & Retail Trade	3,457,665	15.21
Wholesale	1,655,219	7.28
Retail	1,802,446	7.93
Finance, Ins., & Real Estate	1,571,264	6.91
Finance	623,887	2.75
Insurance	833,989	3.67
Real Estate	113,388	.50
Services	2,640,367	11.62
Services	1,293,811	5.69
Medical	411,758	1.81
Educational	611,573	2.69
Other	323,225	1.42
Total Private Sector	22,724,080	100.00

Detail may not add to total due to rounding.

TABLE 1-6

PERCENTAGE DISTRIBUTION OF PRIVATE SECTOR OUTPUT BY
ECONOMIC DIVISION, THE UNITED STATES, 1958, AND
PHILADELPHIA, PA.-N.J. SMSA, 1959

Economic Division	U.S. 1958 (Percent of Total)	Phila. SMSA 1959
Agriculture, Forestry, and Fisheries	6.21	.59
Mining	2.42	.14
Construction	8.41	7.80
Manufacturing	42.29	50.50
Transportation, Communication, and Utilities	7.92	7.22
Wholesale and Retail Trade	11.55	15.21
Finance, Insurance, and Real Estate	10.72	6.91
Services	9.48	11.62
Total Private Sector, Percent	100.00	100.00
Output (Million \$)	824.330	22.724

Sources: U.S.--National Economic Division Staff, "The Transactions Table of the 1958 Input-Output Study, Revised Direct and Total Requirements Data", Survey of Current Business, Vol. 45:9 (September, 1965) Table 1. The output of the three dummy industries Sector 81, Business, travel, entertainment and gifts, Sector 82, Office Supplies and Sector 83, Scrap, used and second-hand goods, was excluded from the tabulation. This combined output was calculated as 1.14 percent of the total private sectors output.

The private sectors consist of ORE industries 1 to 77 (see Ibid for their definitions) which do not correspond exactly to the Philadelphia table industries at this level of aggregation.

the available resources for the study. In particular, two broad categories can be distinguished: (1) the sampling of specific industries particularly important to an area as in the Utah Study⁽¹⁾; and (2) the systematic sampling of each industry in the region, as in the St. Louis Study⁽²⁾. The locally collected data are required for the estimation of the structural coefficients.⁽³⁾ They also may be used along with published information to estimate industry outputs and other controls.

In the Philadelphia table the survey approach was used. The strategy adopted was to sample the region's industries on a disaggregated level and to develop coefficients on the basis of local data whenever practicable. Whenever possible, the data of the Penn Jersey Transportation Study was employed.

The questionnaires were generally of two kinds: (1), a long detailed questionnaire, generally with a satisfactory coverage for the size and distribution of the industry taking into account budgetary and time limitations and (2), a limited survey intended either to augment the data obtained from the long questionnaires or to include some of the industries which were not sampled by the more extensive method. All of these sources were augmented by the Penn Jersey Transportation Study's

(1) Frederick T. Moore and James W. Peterson, "Regional Analysis: An Interindustry Model of Utah" Review of Economics and Statistics, Vol. XXVII:1, (Nov. 1955), pp. 363-383.

(2) Werner Z. Hirsch, "Interindustry Relations of A Metropolitan Area," Review of Economics and Statistics, Vol. XLI:4 (Nov. 1959), pp. 360-369.

(3) An alternative approach now being investigated is the estimation of some key coefficients (e.g. total material inputs and payroll) for each industry based on local data which can then serve to derive adjustment factors. These factors are applied to the detailed coefficients obtained from another, technologically similar area in order to estimate the given area's structural coefficients. See Walter Isard, Eliahu Romanoff, with the assistance of Lucy Alspach, The Boston Region Interindustry Study, 1958, Key Coefficients for the Industries, Technical Paper Number 2 (Cambridge: Regional Science Research Institute Boston Office, 1966).

Regional Economic Survey returns by local secondary sources, mostly available in published form, and by interviews with knowledgeable persons in the industry. Measures of output, sources of information, and the level of disaggregation employed in collecting and processing the data are summarized in Table 1-7.

Conduct of Survey

The following paragraphs outline the basic survey procedure developed as a result of the experience gained in the early stages of the study. This procedure was applied first to the manufacturing industries and then with minor modifications in the survey of the other economic divisions.

First, for each industry, a list of selected establishments was prepared in accordance with the appropriate sample design described further in the text.

Second, an initial contact with each of the selected establishments was made in the form of an introductory letter by Willis J. Winn, Dean of the Wharton School of Finance and Commerce. This letter introduced Professor Walter Isard, the Director of this Project, outlined the purpose of the Study and its possible usefulness for economic policy formulation for the Philadelphia region, and assured confidentiality of response. It was accompanied by a second letter from John K. Tabor, Secretary of Commerce, Commonwealth of Pennsylvania, to Walter Isard in which he expressed his interest in the study and his hope that business firms would cooperate by providing the requested data. (1)

The third step, taken about five days after the mailing of the letters, was to arrange by telephone an interview with the potential respondent. The actual interview, which generally took from 30 minutes

(1) See Appendix B - 1 for copies of these letters.

TABLE 1-7

MEASURES OF SECTORS, LEVEL OF DISAGGREGATION, SOURCES OF DATA AND
MEASURES OF OUTPUT, PHILADELPHIA, PA.-N.J. SMSA INPUT-OUTPUT TABLE 1959

Economic Division	No. of Sectors	Level of Disaggrega- tion Number of SIC Digits	Sources of Informa- tion SSPI	Measures of Output
A. Agric., Forestry & Fisheries	6	3 & 4	XX	Value of Prod.
B. Mining	4	4	XX	Value of Ship.
C. Contract Construction (incl. operative builders, SIC 656)	8	3 & 4	X XX	Adjusted Value of Const. Put in Place
D. Manufacturing	361			
Ordnance	1	3	XX	Value of Sales
Manufacturing	360	4	XXX	Value of Sales
E. Trans., Comm. & Util.	16			
Transportation	8	2,3,4	XX	Value of Prod.
Communication	4	3 & 4	X X	Value of Sales
Elec., Gas, Sanit. Serv.	4	3 & 4	XX	Value of Prod.
F. Wholesale & Retail Trade	74			
Wholesale	34	4	X X	Value of Sales
Retail	40	3	XXX	Margins
G. Finance, Ins. & Real Est.	9			
Finance	6	3 & 4 (agg)	X X	Value of Earn.
Insurance	2	3 agg.	XX	Value of *
Real Estate	1	2 & 3 agg.	X	Value of Receipts
H. Services	12			
Services	4	2	XXX	Value of Receipts
Medical	2	3 & 4 agg.	X X	Value of Input
Educational	3	3	X X	Value of Input
Other	3	2	XX	Value of Input
I. Government	9			
Local	3	form of gov't	X	Value of Input
State	6	Administratives and functions		Value of Input
J. Dummy	1		X X	
Total Intermediate	500			

* Life Ins., cost of underwriting & investment; non-life, Value of premiums earned.

Sources of Information:

- S - Survey with detailed questionnaires and personal interviews
- s - Limited survey generally with a small sample and short questionnaires, mostly by mail.
- P - Published or other secondary sources.
- I - Interviews with knowledgeable persons in Industry.

to over an hour, was intended to acquaint the respondent with the questionnaire and complete the questionnaire as far as possible. In cases where not all the requested information could be furnished during the interview, the questionnaire, together with a set of printed instructions and a return mail envelope was left with the respondent to mail upon completion.

If the questionnaire was not returned within four to six weeks after the interview, the respondent was contacted again by mail. If the questionnaire was not received during a period of 30 days following the reminder letter, a telephone call was made to urge the respondent to complete the questionnaire and to inquire if further assistance in answering the questions was desired.

The receipt of the questionnaire was followed by the fourth, and final step, namely, the mailing of a letter thanking the respondent. The questionnaire was then recorded and filed in the respective industry folder for subsequent processing.⁽¹⁾

Information Requested

The long questionnaires were designed to obtain the following data:

1. Input Structure of the Establishment. The information requested was grouped by major input components, where for some a detailed breakdown was also sought. For instance, total dollar value of materials consumed by the establishment was requested as a

(1)

See Appendix B-1.

separate item from the dollar values of detailed material inputs. The difference between the sum of the value of the detailed items and the total value of materials which was separately specified should, ideally, have yielded the values on the unspecified material inputs and have guarded against errors in underestimation. (1)

Although it is possible to build an input-output table by specifying either the input structure (columns), or the distribution of sales (rows) for each industry in the system, (2) preferably by both approaches to permit crosschecking, the former approach was considered more reliable. It is based on production cost information, which is generally kept by each establishment. Data on sales distribution among firms, at the detail required for this study, would have been more difficult to have processed. (3)

2. The Geographic Origin and Destination of Purchases and Sales.

The respondent was requested to identify the geographic origin of items purchased, that is, whether they originated in the SMSA or were "imported" from outside. For the latter category a breakdown

(1)

For a more detailed description of the input information obtained in the manufacturing questionnaires, see Chapter 2, Table 2 - 1, and the section on classification and measures of input and output. See also Chapter 3 for the input information obtained for the mining and construction industries.

(2)

For examples of input-output tables built from output data see Robert E. Coughlin and Walter Isard, Planning Efficient Hospital Systems Discussion Paper Series No. 1 (Philadelphia, Regional Science Research Institute, 1963), and Lee Hansen and Charles M. Tiebout, "An Intersectoral Flows Analysis of the California Economy", Review of Economics and Statistics, Vol. 45:4 (Nov. 1963).

(3)

Walter Isard et al. Methods of Regional Analysis. (New York: John Wiley and Sons, Inc. 1960) pp. 322-326, and Leon Moses "The Stability of Interregional Trading Patterns and Input Output Analysis", American Economic Review, Vol. 45:4, (Dec. 1955)

by states or other geographic areas was also requested. Similarly, information on the geographic destination of sales was requested by type of product. Here the respondent was requested to list the percentage of the output item sold to other manufacturers in the SMSA and to those outside the region as well as the percentage of sales to wholesalers, retailers and, in the case of the manufacturing questionnaires, directly to households. On the whole, the response to these questions, particularly those pertaining to the destination of output among the manufacturing industries, was lower than the response to the questions concerning the origins of inputs. It is interesting to note that the RIS survey experience was at variance with that of Hansen and Tiebout in their survey for the California intersectoral flow tables, where they state that "in terms of input-output flows, information for 'rows' is easier to obtain than for 'columns'".⁽¹⁾

3. Proportion of Sales to Defense-Related Agencies. This group of questions sought to obtain data on the percentage of sales of the area's firms to defense-related agencies. Here firms were classified as prime contractors and subcontractors. For the latter group the information on the geographic distribution of sales to defense prime contractors was also requested.⁽²⁾

(1)

Ibid., Hansen, and Tiebout, loc. cit.

(2)

See Walter Isard and Eugene W. Scholler "An Economic Analysis of Local and Regional Impacts of Reduction of Military Expenditures", Papers, Peace Research Society (International) Vol. 1, (1963), pp. 15-44, the forerunner study to this project. For some preliminary tabulations of defense-related sales, see Gerald J. Karaska, "Interregional Flows of Defense-Space Awards", Papers Peace Research Society (International), Vol. 5, (1967) The Department of Regional Science, the Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania.

Selection of the Base Year

As already indicated, the choice of 1959 as the base year was influenced by the Penn Jersey Transportation Study, which made available copies of its Regional Economic Survey for that year. Although the Penn Jersey Transportation Study lightened the data collection load, this choice created two problems: (1) it was necessary to reconcile the Penn Jersey Transportation Study data with ours and (2) it made additional demands on control estimates for an off-Census year.

Sectoring Plan

As previously indicated, the sectoring plan required the disaggregation of activity into a finer breakdown than the OBE sectors. The sectors were identified on a 3 and 4-digit SIC level, as noted in Table 1-7. They were constructed to assure the independence of each economic division and, in some cases, their major components. Residual input data were aggregated into special sectors, such as RIS 39999. Statistical discrepancies in control estimates were also assigned to residual sectors in each group. In this way the sectors were defined such that in almost all cases they can be aggregated into the OBE sectors of the national input-output table for 1958. In addition, the use of the residual industry made it possible to revise parts of the table without affecting others.

The Survey of Manufacturing Industries

The survey of manufacturing industries was the first to be undertaken. The experience gained from this survey helped to improve the survey procedures for the other sectors.

The survey of the manufacturing industries was designed to

provide estimates of structural coefficients (dollar inputs per dollar output) for the area's industries. In addition, information on the value of output per employee was obtained to provide estimates of total industry output to augment the secondary data available for the five-county Pennsylvania part of the SMSA.

The level of industry classification from which samples were selected was the 4-digit SIC detail. This classification was considered reasonable given the objective of the study. ⁽¹⁾ All 4-digit SIC industries were sampled with the exception of a few small industries, primarily those consisting of a very few establishments and those with a total employment of less than 200. Although it was intended to survey these small industries, the difficulties in obtaining the data when compared with their potential utility led to ⁽²⁾ the abandonment of this course of action.

The following lists some of the more important characteristics of the manufacturing industries of the Philadelphia region which affected the survey design, and some associated problems.

1. The number of establishments by industry tended to range from one or two to over 400. The sampling of industries having less than ten establishments, and particularly those of six or less, proved to be most difficult; and the collected data were generally subject to non-disclosure requirements.

2. The distribution of establishments by employment size in

(1)

Originally it was intended to separate the large 4-digit SIC industries in each OBE sector, and aggregate the remaining industries at a 3-digit level. However, after the evaluation of initial sampling work, it was decided to sample each 4-digit SIC manufacturing industry.

(2)

The problems encountered in the survey of small industries are further elaborated in the text. See also Chapter 2.

(1)
most industries was highly skewed. This led to the choice of the larger establishments in sampling procedures.

3. Since the survey was undertaken in 1963-1964, the turnover in establishments by industry affected the true 1959 population available for sampling. Replacements of selected establishments were necessary to compensate for changes in the composition of establishments by industry since 1959. (2) Firms changing SIC codes required careful classification checks. Most firms tended to change a 4-digit SIC classification within a 3-digit SIC code. The majority of the other firms changing classification did so within a 2-digit industry group.

4. The competitive position of some industries and their business practices tended to reduce the response rate because of possibility of information leakage. Similarly, some non-corporate establishments were hesitant to divulge the breakdown of administrative costs since, in doing so, they might reveal their profit position.

5. The quality of response, and the response rate, varied by size of establishment. Detailed data based on company records were

(1)

U.S. Bureau of the Census. U.S. Census of Manufacturers: 1958 Location of Manufacturing Plants by County, Industry and Employment Size. Part 2. Middle Atlantic States, Special Report MC 58(s)-3.2 (U.S. Government Printing Office, Washington, D.C., 1961).

(2)

Data on the number of establishments beginning operations, terminating operations, changing names, location, and line of product (SIC classification), were available for the Pennsylvania part of the region from the Commonwealth of Pennsylvania, Department of Internal Affairs, Supplement to the 1959 Industrial Directory. (Harrisburg: Bureau of Statistics, Nov. 1960).

obtained mostly from the larger establishments which had full accounting departments and could rely on electronic data processing methods. On the other hand, estimates in lieu of recorded data were best supplied by respondents representing small establishments since here respondents are closer to the production process and could recall most information requested and easily estimate the rest. The poorest data came from the medium-sized establishments.

Selection of Sample

The selection of manufacturing establishments to be sampled started with a preliminary estimate of the number and employment of establishments in each 4-digit SIC industry. This preliminary estimate served as the frame from which the sample was selected and as a base for the industry control estimates discussed in Chapter 4. The Industrial Directory of the Commonwealth of Pennsylvania, for 1960, provided the total number of establishments and employment (1) by each Pennsylvania county. For the New Jersey counties, reference was made to the N. J. Industrial Directory and to the industrial directories of Burlington and Camden counties, in order to arrive (2) at a crude estimate for the remaining three counties in the region.

(1)

Commonwealth of Pennsylvania, Department of Internal Affairs, 1962 Industrial Directory of the Commonwealth of Pennsylvania, (16th Edition), (Harrisburg, Bureau of Statistics, 1962).

(2)

1960-1961 New Jersey Industrial Directory (New York, New Jersey Industrial Directory, 1956). Camden County Chamber of Commerce, Camden County Industrial Directory, (Pennsauken, New Jersey, The Chamber, 1961). Burlington County Planning Board, Industrial Directory (Mount Holly, New Jersey, The Board, 1956).

These, together with additional sources, served to build up the
(1)
list from which establishments could be selected.

In the development of the sample design no attempt was made to obtain a representative sample of the manufacturing industries by size class of employment. Difficulties in obtaining quality data, in terms of detailed input specification, from the smaller establishments, precluded such refinement. Moreover, the large number of industries having 10 or less (or even 20 or less) establishments in the region constituted another major obstacle.

As noted in the Introduction, the following criteria, which evolved as a result of initial sampling, were established:

(a) Each 4-digit SIC represented in the region should be sampled.

(b) Within each 4-digit SIC, a sample of at least 25 percent of th total employment should be obtained.

(c) Within the 25 percent employment coverage, the number of surveyed establishments should be minimized, but in no case be less than three.

(d) Initially, all establishments with 200 employees or more were to be interviewed. This criterion, following Penn Jersey Transportation Study procedures, was later changed in favor of obtaining at least three of the largest establishments in each

(1)

Chamber of Commerce of Greater Philadelphia, Business Firms List of Greater Philadelphia, 1963; Bucks County Industrial Development Corporation, Directory of Manufacturing Plants in Bucks County, Pa. (Doylestown, Pa., The Corporation, 1963). The Corporation, 1963). Delaware County Chamber of Commerce, Delaware County Directory of Manufacturing and Processing Firms, (Chester, Pa. The Chamber, n.d.) Montgomery County Industrial Development Committee, 1963 Industrial Directory of Montgomery County, Pa. (n.p. The Committee, 1963).

4-digit SIC category. Selection of new establishments, to replace refusals and other non-responding units, at times left only establishments with less than 50 employees to be surveyed.

(e) Where preliminary analysis of the returns indicated considerable heterogeneity among the sampled establishments (because of differences in scale of operations, process, productivity, etc.) additional interviews were to be conducted.

Locational bias crept into the sample as a result of three factors. First, firm listings were more readily available, and on a more accurate basis, for the Pennsylvania part of the region. Second, ease of access and the need to minimize interview costs led to overrepresentation of center city Philadelphia establishments, particularly in the selection of replacements. Similarly, in other Pennsylvania counties, those establishments located closer to Philadelphia were chosen in preference to those located at the rim of the region. Third, Bucks County establishments were sampled more carefully, and with a larger coverage than those in other outlying counties, since one of the long-run objectives of the research within the Department of Regional Science is eventually to construct for a county an input-output table which could be linked to the larger regional table.

Penn Jersey Transportation on Study's Regional Economic Survey

The actual task of data collection was somewhat lightened since, at the early phases of the study, copies of the Penn Jersey Transportation Study's Regional Economic Survey returns for 1959 were made available. Although the Regional Economic Survey, conducted in 1960 and 1961, obtained about 2500 questionnaires for the various

economic divisions in the region, the forms were for the most part incomplete and could provide only a small part of the required data for the Philadelphia Input-Output Study. In all over 600 manufacturing (1) long and short questionnaires were made available from this source.

Two types of sampling procedures were used in the Penn Jersey Transportation Study's Regional Economic Survey:

a. Personal interviews with the use of long forms were conducted among the larger establishments in each industry. In manufacturing, all plants with more than 200 employees were contacted while in some service industries, like advertising, establishments with as few as ten employees were sampled. Retail establishments located in twelve selected shopping centers were sampled as well as some of the important retail chains.

b. An augmentative mail survey using short forms, with a sample selected on the basis of the Bureau of Employment Security data stratified by size of employment, was directed at the smaller establishments. For each stratum a systematic sample was drawn at predetermined rates, where in the largest class, of 100-200 employees, the rate was 50 percent and in smaller employment classes it was lower.

One of the main differences between the long and the short forms was that the short forms were designed to obtain only the total cost of materials, and not detailed material costs information.

(1)

See George Perazich, Recent Economic Changes in the Five-County Philadelphia Region, PJ Paper No. 3 (Philadelphia: Penn Jersey Transportation Study, 1961). The description of the Regional Economic Survey is mainly from this source.

For the manufacturing industries, the Penn Jersey Transportation Study made available copies of 221 long or interview-type questionnaires and 397 short forms of its augmentative mail survey.⁽¹⁾ These were classified according to their usefulness and quality of response as shown in Table 1 - 8

TABLE - 8

DISTRIBUTION OF PENN JERSEY TRANSPORTATION STUDY
MANUFACTURING QUESTIONNAIRES, BY TYPE AND QUALITY

Quality Code	Quality of Return	Type of Questionnaire		Total	Percent of Total
		Long (Interview)	Short (Mail)		
A	Complete Form	99	-	99	16.0
B	Partial Form, without detailed material inputs	28	315	343	55.5
C	Incomplete Form	94	82	176	28.5
Total		221	397	618	100.0

Similarly in the other industries, the Penn Jersey Transportation Study questionnaires which were made available contributed to the survey to varying degrees.

D-Type Questionnaires

Since the bulk of the Penn Jersey Transportation Study data for the manufacturing industries consisted of partial returns, it became apparent that these had to be augmented.

(1) Some of the 618 Penn Jersey Transportation Study returns were for Mercer County, New Jersey, and these were excluded from the SMSA industry data. The Mercer County returns were used at times as statistical establishments to augment or conceal non-disclosable SMSA data. See Chapter 2.

To this end, a special short form was prepared, designated by code D, and sent to those establishments which were covered by the Penn Jersey Transportation Study mail survey, and had returned B-type questionnaires (defined in Table 1 - 8). The D-type questionnaires were aimed at obtaining data primarily on detailed material inputs. In this way, the sets of both data were combined to yield a completed, A-type questionnaire. This procedure yielded 180
(1)
complete returns.

As expected, experience with the above procedure indicated that respondents were more amenable to the short, D-type, questionnaire than to the more lengthy RIS A-type, since the D-type was easier to complete. As a result, the D-type forms were used not only to augment the Penn Jersey Transportation Study short forms, but also to obtain data from other establishments in the region. Specifically, they were used in the following situations:

(a) When additional establishments were needed to replace refusals in industries whose establishments were more reluctant to participate in the survey than normal experience indicated.

(b) In 4-digit SIC industries, having a small number of establishments (six or less), and a small total employment size (less than 200 employees).

(c) In industries where the survey data indicated that inputs seemed to be too heterogeneous and additional information was needed.

(d) To overcome disclosure problems.

(1) See Appendix B-1 for a copy of the D-type questionnaire and Chapter 2 for the method employed in deriving estimates from these returns.

On the whole, however, the short D-type forms were used only to supplement the bulk of the survey which was based on RIS long forms.

In designing any questionnaire, the desire to increase the number of questions and probe more deeply into input-output characteristics, thereby increasing the level of information, had to be constantly weighed against the risk of reducing the response rate associated with lengthy forms. This consideration is particularly important in a study of the type conducted where respondents volunteered information and incurred the cost of assembling the data in the form requested.

Industry Coverage

Number of Industries Covered. Of the total 424 4-digit SIC manufacturing industries (SIC 20 to 39) classified by the SIC Manual, there were 378, or about 89 percent identified in the region. These industries, which were estimated to have 7,999 establishments in 1959, were sampled by the procedures outlined above with an estimated response rate of 54.4 percent.⁽¹⁾ In all, questionnaires from RIS and PJTS sources were obtained for 332 4-digit SIC industries, or for almost 88 percent of the region's manufacturing industries. A review of the industries covered in the survey showed that 3 or more complete questionnaires (in addition to some partial and incomplete returns) were obtained for 149, or 39.4 percent, of the manufacturing

(1)

The estimate of this response rate is based on a sample of 72 4-digit SIC surveyed industries.

industries. On the other hand, for 69 industries only one complete return (in addition to partial and incomplete ones) were obtained per industry. For nine industries only partial and incomplete questionnaires were obtained.

These above data are summarized in Table 1 - 9. However, this summary pertains to the survey response only. It lists the number of returns obtained and not the number of returns used in estimating the interindustry coefficients. The difference between the survey response as listed in these pages and the industry data described in Chapter 2 is the exclusion of both inconsistent returns and late arrivals and the reclassification of certain returns upon further study. The methods used in evaluating the returns and arriving at the estimates are described in Chapter 2.

Coverage of Large Establishments. As previously noted, the sample was intended to cover the largest establishments because of difficulties in effectively sampling the smaller ones. As a result, the returns represent production mostly associated with large-scale operations.

Since both the PJTS and RIS surveys aimed at sampling the largest establishments in each industry, the following evaluation of the coverage obtained from both sources was made. Of the estimated 68 largest establishments in the region, with 1000 employees and over (and accounting for 37.9 percent of the total manufacturing employment) 45.6 percent were successfully sampled by complete, A-type questionnaires. This figure accounted for 17.6 percent of the manufacturing employment in the area. These large establishments were sampled at a rate of 100 percent. The total response rate among

TABLE 1-9

MANUFACTURING INDUSTRIES COVERED AND NUMBER OF COMPLETE
QUESTIONNAIRES OBTAINED BY INDUSTRY

Number of 4-Digit SIC Industries									
SIC	In SIC Manual	In Phila. SMSA	Total	Covered				Over 3	Not Covered
				No. of Complete Returns					
				None	1	2	3		
20	45	37	30	3	11	9	3	4	7
21	4	3	1	---	1	-	-	-	2
22	29	28	26	1	4	8	6	7	2
23	33	33	31	---	4	10	9	8	2
24	13	10	7	---	-	3	1	2	3
25	12	12	11	---	1	4	2	4	1
26	16	14	13	1	6	5	-	1	1
27	16	16	16	---	1	5	4	6	-
28	31	25	22	---	10	6	3	3	3
29	5	4	4	---	1	-	2	1	-
30	5	5	5	---	3	-	-	2	-
31	10	9	9	---	1	4	3	1	-
32	27	24	22	---	5	9	6	2	2
33	24	21	17	---	5	5	5	2	4
34	27	26	23	---	2	5	3	13	3
35	40	37	31	---	2	9	9	11	6
36	33	28	23	2	5	8	4	4	5
37	16	12	11	1	2	6	1	1	1
38	11	9	9	1	-	3	1	4	-
39	27	25	21	---	2	8	7	4	4
Total	424	378	332	9	66	107	69	80	46
Percent		100.0	87.8	2.4	18.2	27.8	18.2	21.2	12.2

the large establishments, regardless of quality, accounted for 70.6 percent of their employment, or 26.8 percent of the total employment in manufacturing. These data are summarized in Table 1 - 10.

Coverage of Small Industries. Although an objective was to obtain at least three returns for each industry, unfortunately, this was not always achieved. Some small industries with three or less establishments were not sampled at all, since the preliminary employment estimates did not identify them in the region. In a few cases, the output of a single return for a small industry indicated that the establishment should be reclassified. In other cases, the one or two establishments of a small industry, as listed in the directories, could not be located, either due to directory classification errors or changes in name, location, or line of production during the five year interval between the survey base year and the time it was under-⁽¹⁾taken. In still other cases, one or two refusals reduced the number of returns for a small industry to less than the desired number or to none at all.

The above problem pertained to small industries which did not grow in number of establishments since 1959. Those small industries which did grow were much easier to survey. In fact, for some small industries a coverage of 100 percent of the establishments and of over 100 percent of the employment was realized, due to the expanded population at the time of the survey.

(1)

The problems raised by time lag were also present where larger establishments left the area since 1959, yet were part of the control for that industry. (E.g. the Ford Motor Co. plant of Chester, Pa. with over 1,500 employees in 1959 ceased operations in 1961.)

TABLE 1-10

SURVEY COVERAGE OF MANUFACTURING ESTABLISHMENTS OF 1,000 EMPLOYEES
AND OVER BY EMPLOYMENT SIZE AND QUALITY OF RETURN

Employment Class	No. of Estab. in Region	Number of Responding Estab. by Quality of Return				Estab. not Responding
		A ^a	B	C	D	
5,000 and Over	9	6	1	1 ^b	-	1 ^c
4,000 - 4,999	4	2	-	2	-	-
3,000 - 3,999	8	5	-	1 ^b	-	2
2,000 - 2,999	17	7	5	2 ^b	1	3
1,000 - 1,999	30	11	4	-	1	14
Total Establishments	68	31	10	6	2	20
Employment in large establishments (percent)	100.0	45.6	14.7	8.8	1.5	29.4
Percent of total manufacturing employment	37.9	17.6	5.5	3.1	0.6	11.1

^aSince more than one questionnaire may have been obtained for an establishment (i.e. B-type plus D-type combinations), due to differences insources of data and type of form, total number of questionnaires exceeded the number of establishments in this group. See text.

^bEstablishments for which only material inputs originating in the region are available.

^cAlthough requests were made to this establishment, the return of the questionnaire was not pursued since satisfactory substitute data were available to meet the requirements of the 4-digit SIC industry coverage.

Although the response rate for small industries was about 40 percent and although a few PJTS returns were available to augment the RIS survey, the sample for industries of less than ten establishments generally required additional interviews to increase coverage to the desired levels, and to avoid disclosure problems. The coverage of small industries is summarized in Table 1 - 11.

TABLE 1 - 11

SMALL 4-DIGIT SIC INDUSTRIES COVERED AND NOT COVERED,
BY NUMBER OF ESTABLISHMENTS IN INDUSTRY

No. of Estab. in Industry	Total No. of Industries in Region (RIS Est.)	Responding industries with:			
		3 or more Complete Returns	Less than 3 Complete Returns	Partially Complete and Incomplete Returns	Not Covered (Not Surveyed or no response)
1	27	-	9	1	17
2	26	-	12	1	13
3	27	-	18	1	8
4-6	59	5	47	1	6
7-9	35	10	22	2	1
Total	174	15	108	6	45

Coverage of Industries. Complete questionnaires were obtained for 921 establishments, or for 74.8 percent of the 1231 reporting. These 921 establishments accounted for 79.8 percent of the reported employment in all returns. In toto, 15.4 percent of the establishments in Philadelphia SMSA were covered, with 52.6 percent of the regional employment. Summary data on a 2-digit level on the number of establishments and employment covered by complete and by partially

complete and incomplete questionnaires, and percentages coverage are
 (1)
 presented in Table 1 - 12. Employment coverage in 9 out of the 20
 2-digit SIC major groups was 55 percent or more. The groups are
 SIC 28, 29, 30, 32, 33, 35, 36, 37 and 38. The high coverage reflects
 the large establishments typical of these industries. Most of the
 68 large establishments tabulated in Table 1 - 12 fall into these
 categories. Employment coverage in six major industry groups was
 between 35 to 54 percent, while that for 4 industry groups was between
 25 to 34 percent. Only SIC 21, tobacco manufacturers, was poorly
 covered.

As was noted previously, the number of reported establishments
 exceeded the number of edited establishments used in estimating the
 industry coefficients. The methods whereby the returns were evaluated
 (2)
 and estimates obtained are described in Chapter 2.

Date of Survey Information

As previously noted, to utilize the PJTS Regional Economic
 Survey the Philadelphia study was designed for the base year 1959,
 although the survey actually took place in 1963 and 1964. However,
 not all respondents could furnish information for 1959; some returns
 were for later years. Generally, the short RIS forms which were used
 more extensively toward the end of the survey period, reported

(1) See Appendix B-2 for a detailed tabulation (after editing) of
 number of establishments and employment by quality of return,
 and industry coverage at a 4-digit SIC level.

(2) Compare the data in Table 1 - 12 with that of Table 2 - 7.
 Also see Appendix B-2 which lists in detail the employment in
 edited establishments.

TABLE 1-12

MANUFACTURING INDUSTRIES,
EMPLOYMENT OF REPORTING ESTABLISHMENTS
AND COVERAGE, SUMMARY, BY 2-DIGIT SIC

Reporting Establishments							Regional Estimates		Survey Coverage Percent	
SIC	Complete Questionnaire		Partial and Incomplete Questionnaire		Total Reporting					
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.
20	60	20,714	33	3,911	93	24,625	771	52,664	12.1	46.8
21	1	7	--	--	1	7	20	4,408	5.0	0.2
22	73	8,267	29	1,923	102	10,190	490	37,125	20.8	27.5
23	94	14,127	50	4,640	144	18,767	1,008	58,310	14.3	32.2
24	16	813	7	273	23	1,086	199	3,178	11.6	34.2
25	34	2,552	7	374	41	2,926	267	7,159	15.4	40.9
26	32	8,711	16	2,188	48	10,899	233	21,892	20.6	49.8
27	57	17,448	23	973	80	18,421	999	41,104	8.0	44.8
28	43	7,342	28	14,515	71	21,857	422	33,955	16.8	64.4
29	12	11,474	--	--	12	11,477	51	15,802	23.5	72.6
30	17	4,415	5	3,348	22	7,763	151	12,773	14.6	60.8
31	22	2,238	2	52	24	2,290	108	6,352	22.2	36.1
32	51	5,717	10	2,506	61	8,223	326	14,507	18.7	56.7
33	39	13,596	11	8,885	50	22,481	203	37,032	24.6	60.7
34	93	14,337	26	1,713	119	16,050	932	43,807	12.8	36.6
35	119	28,356	21	1,116	140	29,472	790	47,927	17.7	61.5
36	50	31,532	17	7,378	67	38,910	329	56,434	20.4	68.9
37	21	35,521	7	2,310	28	37,831	108	42,113	25.9	89.3
38	29	5,657	12	2,804	41	8,461	156	13,692	26.3	61.8
39	58	2,475	6	585	64	3,060	436	10,369	14.7	29.5
Total	921	235,299	310	59,514	1,231	294,796	7,999	560,603	15.4	52.6

information for the years, 1962-1964. This was true also for some of the long forms. It is estimated that data for establishments accounting for 82 percent of the employment covered in the manufacturing sectors are for 1959, and 12 percent for 1963 (the year of the most recent Census of Manufactures).⁽¹⁾ These estimates are presented in Table 1 - 13.

TABLE 1 - 13

PERCENTAGE DISTRIBUTION OF REPORTED EMPLOYMENT, BY YEAR: SELECTED 2-DIGIT SIC MANUFACTURING INDUSTRY GROUPS, AND ALL MANUFACTURING

Year for which data reported	Food SIC 20	Textiles SIC 22	Machinery SIC 35	Instru- ments SIC 38	All Manufacturing (estimated)
1959	81.0	80.8	85.5	75.1	82.0
1960	0.9	0.6	0.8	-	0.7
1961	1.0	-	-	-	0.3
1962	5.5	5.0	0.2	16.4	4.6
1963	11.6	12.8	13.4	8.5	12.2
1964	-	0.8	0.1	-	0.2
Total	100.0	100.0	100.0	100.0	100.0

(1)

These estimates are based on the assumption that the PJTS data collected in 1960-1961 are for 1959. Actually, some of these returns may have been for 1960 and a few for 1961.

Survey of Mining Industries

The survey of mining industries was confined to major group SIC 14, Mining and quarrying of nonmetallic minerals, except fuels. Review of the mining employment data in the U.S. Census of Mineral Industries for 1958 and in County Business Patterns, 1959, indicated that the total mining employment slightly exceeded the employment in major group SIC 14.⁽¹⁾ However, the data did not indicate how to assign, with certainty, the excess employment to any of the other mining categories. Further, the 1962 Industrial Directory of the Commonwealth of Pennsylvania, which includes mining establishments, listed only establishments within SIC 14 for the Pennsylvania counties.⁽²⁾ The review of the directories for the New Jersey part of the region did not identify non-SIC 14 mining establishments. Hence, lists could be compiled for SIC 14 establishments only.

Objective of Survey, and Survey-Related Industry Characteristics.

The survey of mining industries was designed to provide estimates of the input-output structure of the Philadelphia SMSA mining and quarrying industries as well as estimates of the ratio of output per employee by which total industry output could be estimated. Since the review of employment in these industries revealed that most of

(1)

U.S. Bureau of the Census, U. S. Census of Mineral Industries, 1958, Vol. 2, Area Statistics (New Jersey and Pennsylvania) (U.S. Government Printing Office, Washington, D.C., 1961), and U.S. Bureau of the Census and U.S. Bureau of Old Age and Survivor Insurance Cooperative Report, County Business Patterns, First Quarter 1959, Parts 3A and 3B. Middle Atlantic States, (U.S. Government Printing Office, Washington, D.C. 1961).

(2)

Commonwealth of Pennsylvania, Department of Internal Affairs, Op. Cit. and Robert D. Thomson, Mary E. Otte, Robert E. Ela, The Mineral Industries of Pennsylvania in 1960, Information Circular 49. Pennsylvania Geological Survey. (Harrisburg: Department of Internal Affairs, 1962).

the employment was concentrated in SIC 1411 Dimension stone, SIC 1421 Crushed and broken stone, including riprap, and SIC 1441 Sand and gravel. These were sampled separately. The remainder of major group SIC 14 (i.e. SIC 145-149) was aggregated into one sector, designated SIC 1490. This sector, however, was later redefined, as noted below.

The mining industries are closely related to the building material industries in major group SIC 32, Stone, clay, and glass products. Therefore special care was taken to exclude from the lists those establishments which were included in the manufacturing survey. The available manufacturing industry data were used to delete establishments listed in the mining category. Locationally, the mining industries are found near the concentration of deposits they mine. They also tend to be located at the periphery of the region, generally beyond the more densely settled areas. Because of these locational characteristics, survey cost would have been increased substantially if the establishments were surveyed by personal interviews. Accordingly, since the total employment in this industry division was relatively small, namely, 1,593 persons, with an estimated combined output of 30.9 million dollars, a mail survey was considered to be adequate.

The above considerations were reinforced by the PJTS survey experience. The limited coverage obtained in the PJTS survey of mining industries made it advisable that the respondents not identify themselves. In this way information on anonymous questionnaires were not subject to nondisclosure requirements.

Material inputs generally constitute a small fraction of total output in the mining industries; payments to factors of production

(1)
are the major items. Accordingly, questions on nonmaterial inputs were expanded in the questionnaire designed for mining establishments.

Questionnaire Design

Since a short mail questionnaire was considered sufficient for this industry, a one-page questionnaire was designed with a minimum of information requested. Since materials constitute a small fraction of total inputs, questions concerning other inputs for which information is generally available from the firms' accounts were included.

Information requested. Seven categories of information were requested from the mining establishments. (2) These were:

Production--major product in 1959, extent of firm's operation in that year, and value of materials sold.

Employment--average annual employment, and wages and salaries paid.

Materials Consumed--this category included some pre-listed materials.

Other Operating Expenses--including real estate and equipment rented or leased, insurance and telephone.

Major capital equipment purchases during the year.

Proportion of sales within the SMSA.

(1)

Jack G. Faucett "Mining, Fuel and Power", Chapter 7 in Input-Output Analysis, technical supplement to studies in income and wealth Vol. 18. (New York: National Bureau of Economic Research, Inc. 1954), pp. 7-1 to 7-24, and U. S. Bureau of the Census, U.S. Census of Mineral Industries, 1958, Vol. 1, Industry Statistics, (U.S. Government Printing Office, Washington, D.C., 1961).

(2)

See Appendix B-1 for copy of questionnaire.

Transport cost associated with firm's own trucks.

As the experience with the manufacturing survey indicated, the pre-listing of the most commonly used materials tended to reduce response error from omission, and eased the respondent's task, both in understanding the nature of the questions asked and providing the information. The last question, on transport cost, was intended to compare the magnitude of the firm's own transport cost with those estimated on the basis of OBE data.⁽¹⁾

Selection of Sample and Response

A preliminary list of establishments was compiled from the 1962 Pennsylvania Industrial Directory to include the establishments in the five-county area and from the New Jersey Industrial Directory for the three New Jersey counties.⁽²⁾ This list was augmented by establishments taken from county industrial directories, particularly that of Camden County.⁽³⁾ This list served as a frame from which the sample was selected and as a base for estimating industry controls.

The selection of the sample was guided by the following:

- a. Only the largest establishments should be considered, to be surveyed in order of employment size.
- b. One third of the establishments should be surveyed.
- c. Both Pennsylvania and New Jersey establishments should be represented in each industry.

(1)

See Chapter 2 on transport cost estimates and Chapter 3 on the estimated mining coefficients.

(2)

Commonwealth of Pennsylvania, Department of Internal Affairs, Op. Cit. and 1960-1961 New Jersey Industrial Directory, Op. Cit.

(3)

Camden County Chamber of Commerce, Op. Cit.

- d. A total of at least three responding units should be available for each of the three 4-digit SIC industries, separately identified.

In all, 28 establishments were surveyed with 12 responding. See Table 1 - 14. In addition, two PJTS questionnaires (short mail survey) were available. These were added to the industry data.

TABLE 1 - 14

SURVEYED AND RESPONDING ESTABLISHMENTS, BY MINING SECTOR

RIS Sector	Establishments in the Region	Establishments	Responding Establishments
1411	16	5	2
1421	32	13	6
1441	26	8	3
1490	3	2 ^a	1
	77	28	12

- a. The survey list contained only two establishments.

Industry Coverage

The response to the mail survey exceeded expectations, both in terms of quality of returns and industry coverage. The respondents generally added to the list of materials consumed, such that the number of material input items was increased by about 50 percent. Most questions were properly answered. Some respondents were willing to identify themselves, and in their accompanying letters they indicated their interest in the study. Perhaps the success with this survey can be attributed to the facts that the questionnaire was short and that the mining industries are not inundated by various

survey-making organizations, as the manufacturing industries are.

The coverage of the mining industries and the sources of data are presented in Table 1 - 15. Since most of the survey data were for 1963 and 1964, the employment of the responding establishment in RIS 1490 exceeded the sector total estimated for the base year.

TABLE 1 - 15

SOURCES OF DATA AND SECTOR COVERAGE,
SURVEY OF MINING INDUSTRIES

	Reporting Establishments						Estimated Total in Region		Percent Coverage	
	<u>RIS Survey</u>		<u>PJTS Survey</u>		<u>Total</u>					
							<u>Estab.</u>	<u>Empl.</u>	<u>Estab.</u>	<u>Empl.</u>
	<u>Estab.</u>	<u>Empl.</u>	<u>Estab.</u>	<u>Empl.</u>	<u>Estab.</u>	<u>Empl.</u>				
1411	2	18	-	-	2	18	16	87	12.5	20.6
1421	6	185	1	25	7	210	32	951	21.9	22.1
1441	3	73	1	10	4	83	26	533	15.4	15.6
1490	1	26	-	-	1	26	3	22	33.3	118.2
Total	12	302	2	35	14	337	77	1,593	18.2	21.2

Mining Industries not in Area

A review of the input structure of the manufacturing industries revealed that mining products other than those from SIC 14 were consumed in the region. Thus in order to make the interindustry matrix exhaustive, five dummy mining industries were added to the table to represent products imported into the SMSA. In order to preserve compatability with the OBE 1958 sector classification, one of these five dummy industries, namely, RIS 1470, chemical and fertilizer mining, was taken out of the aggregate sector 1490. Hence, Sector 1490, Mining, not elsewhere classified was redefined to

include only the following: SIC 145, Clay, ceramic and refractory minerals, SIC 148, Non-metallic minerals (except fuel) services and SIC 149, Miscellaneous non-metallic minerals, except fuels.

The five dummy mining industries are as follows:

<u>RIS Sector</u>		<u>Related SIC Codes</u>
1010	Iron and ferrous alloy ore mining	1011, 106
1090	Non-ferrous metal ore mining	102, 103, 104, 105, 108, 109
1100	Coal mining	11, 12
1300	Crude Petroleum and natural gas	1311, 1321
1470	Chemical and Fertilizer mining	147

Survey of the Construction Industries

Approaches to Classification of Construction Activity

Within the traditional dichotomy of investment in plant and in equipment, past input-output studies specified one construction industry whose output met the requirements for investment in plant over all the sectors of the model, while the requirements for investment in equipment were met by as many equipment-producing industries as the analysts could separately identify. In addition to the aggregated construction industry whose output represented new construction, with deliveries to final demand sectors only, a "semi-fictitious" industry, Construction, maintenance and repair, met the maintenance and repair requirements of all intermediate sectors. In the more aggregate models, the new construction industry and the maintenance and repair construction industry were combined into one sector.

The disaggregation of new construction by broad categories of output (i.e. residential construction and non-residential construction, with the latter sometimes further disaggregated into two or

more components) was until very recently put into effect only outside the United States--partly because in the United States no national census of construction activity comparable to that of manufacturing or the trades has been available.

The intricate operations of the construction industries and their heterogeneous output have led to the following three approaches in the classification of construction activity:

1. Sectoral approach. This approach classifies the output of the construction industry by the markets it serves, the output being specified by type of construction--residences, commercial buildings, public utility facilities, highways, etc. This more traditional approach to the disaggregation of construction activity according to use of product was expanded recently in Frumkin's⁽¹⁾ study.

2. Generic Approach This approach classifies the output of construction activity by kind of structure built. It distinguishes among the various technical attributes of the structure regardless of how the structure is used and by whom it is owned. In this approach the homogeneity of input requirements can better be maintained, since the physical characteristics of the structure determine the classification. In this respect the approach most closely resembles the classification of manufacturing industries according to primary product, although the construction industries thus defined rarely resemble actual, identifiable industries. The large variety of

(1)

Norman Frumkin, "Construction Activity in the 1958 Input-Output Study", Survey of Current Business, Vol. 45: 5 (May, 1965), pp. 13-24.

basic characteristics of physical structures can be cross-classified (1)
to yield many unique subcategories of the construction industry.

Data difficulties in estimating final demand requirements by this method have precluded its development until now. Nonetheless, this method, when developed, holds promise in bridging the gap between the economic evaluation of development plans and the counterpart physical evaluation of regional planning programs, particularly when cast in terms of dynamic input-output models. A similar method, although (2)
somewhat simplified, is now being developed by Marshall Wood, et al.

3. Process Approach. This approach classifies the construction process by type of activity. A distinction is made between general contractors who are responsible for the overall construction of the project but who may build a part of it themselves, and the sub-contractors whose participation consists of construction of a part only. The construction industries thus identified are linked by the technological requirements of the construction process, by the organizational capabilities of enterprises, and by other factors. However, the output of the general contractors, who include in their inputs the respective outputs of the subcontractors, is short of the

(1)

For example, the frame of the building can be classified according to the material used, such as wood, masonry, etc., where each material can be further classified according to some typical material and construction characteristics (e.g. lightweight wood frame, mill construction wood frame). This last characteristic and its subdivisions can be cross-classified by another, e.g. number of stories built, where the loading requirements of additional stories affect the shape of beams and columns.

(2)

John Dewitt Norton, Philip M. Ritz, Robert M. Waddell and Marshall K. Wood Capacity Planning Expansion Factors, (Washington, D.C., National Planning Associates, forthcoming).

total cost associated with plant construction. Architectural and engineering fees (SIC 8911), paid separately by the owner, are excluded as well as are various real estate commissions and brokerage fees. Other expenses associated with the undertaking of the acquisition of land and construction of a new plant are also excluded.

Ideally, in order to describe properly the operation of the construction industry in an input-output model at a detail comparable with that ascribed to the manufacturing industries, all the three above-mentioned "partial" approaches should be employed.

The method used in this study combined two of the above approaches, the sectoral and the process. Sectors were defined to distinguish between general contractors and sub-contractors; and the output of the general contractors was adjusted upward to represent⁽¹⁾ the total investment cost associated with plant construction.

Moreover, general contractors' sectors were identified by broad categories of type of construction. For the purpose of this study, the general contractors were identified on a 4-digit basis. In the SIC Manual the sub-contractors are listed in major group SIC 17, Special Trade contractors. For our purpose only SIC 1711, Plumbing, heating and air conditioning and SIC 1731 Electrical work were separately identified; all other subcontractors were aggregated into one sector.

The construction activities of the real estate categories of SIC 6551 Subdividers and developers and SIC 6561 Operative builders,

(1)

See Chapter 4 for estimates of output for the construction Industries.

were aggregated into one industry and were placed with the construction industries whose operations and output they resemble.

The General Contractors

General contractors who work directly for the owner (investor) and who are responsible for the general construction contract were surveyed to obtain data on their input structure. Questions on both the total value of construction work and the value of the work subcontracted to the special trades were asked in order to obtain estimates on the inputs of the subcontractors to the general contractors and thus avoid double counting. In this way the composition of output of the sub-contractors (to the general contractors) could be identified and their input structure separately estimated by the survey of the special trades contractors. The operative builders who build on their own account, mostly for sale, and for whom a different questionnaire was designed, were similarly queried about the inputs from the special trades contractors.

The general contractors sectors identified were:

SIC 1511 General Building contractors

SIC 1611 Highway and street construction, except elevated highway.

SIC 1621 Heavy construction, except elevated highway and street construction.

SIC 6560 Operative builders.

Information Requested. An interview type questionnaire was designed for SIC 1511, 1611, 1621 and the special trade contractors in major group SIC 17. For SIC 6560 a separate form was needed. See Appendix b-1 for copies of these questionnaires.

In surveying the contract construction industries information

requested on the following:

- A. Average annual employment.
- B. Wages and salaries paid during the year.
- C. Value of construction work done during the year, with estimates of the percentage of output in Bucks County, outside the Philadelphia SMSA, and percent of maintenance and replacement work.
- D. Value of materials purchased by type of distributive source (e.g. manufacturers, wholesalers) and by location (inside⁽¹⁾ and outside SMSA)
- E. Value of subcontracts by trade, and the percent of local subcontractors' inputs.
- F. Equipment expenditures on current and capital accounts.
- G. Other operating expense items generally available from firm's accounting books. This information was requested since the survey of manufacturing industries indicated that some of the non-material inputs are important to a description of inter-industry linkages and that these inputs can often be easily obtained from a firm's records.
- H. Distribution of firm's construction work by contracting client (i.e. government, commercial) with the percentage of work performed for each type of client within the region.

The purpose of this question was to obtain a measure of the

(1)

Material inputs were prelisted on supplementary sheets. These sheets represented aggregate special trade inputs extracted from architectural and engineering construction specifications, with inputs precoded on 4-digit SIC basis.

homogeneity of sectoral output by type of construction and to investigate the possibility of disaggregating the 4-digit SIC industries by sectoral output.

I. Receipts from non-construction activities.

The questionnaire for SIC 6560 requested information on items A to G above and the following:

- H. Number of lots created during the year through the subdivision process and number of dwelling units built. The purpose of this question was to link the respondents data to those data available in the region on the number of building permits authorized and subdivision lots created.
- I. Percent of total value of construction work not sold but deeded to government (roads, utilities, public buildings and facilities).

Special Trade Contractors

The separate identification of special trade contractors represents a departure from the regular treatment of construction sectors in the implementation of input-output studies. Had the general contractors and their respective special trade contractors been combined into one industry, as is the usual practice, the inputs required by the sub-contractors would have to be estimated by the general contractor interviewed. This procedure is likely to generate errors in the estimated input requirements by subcontractors, particularly in the listing of materials and overhead costs. The reason for such error may be seen in the highly specialized nature of the different trades contractors work. Although the SIC Manual lists only eighteen 4-digit categories of special trade contractors,

in actual practice the number of trades (as commonly accepted in the industry) is much larger. Also, general contractors, when interviewed are likely to exclude subcontractors margins and also provide insufficient detail on specialized subcontracting operations.

In the Philadelphia input-output study, the construction process is divided into trades (also characterized as sections in the trade literature). Trades are characterized either by the use of common materials (carpentry, masonry), or by the installation of parts of buildings (roofing, floorings) where specialized knowledge is required. Generally, each trade is responsible for the purchase and fabrication of the components it is to install, their erection on site and the completion of its work in such a way that other trades can take over and continue the construction process. Trades must follow some chronological order to reduce the number of workers on the site at any given point in time and their work must be completed without the need to return to the site at a later date. Foundation and roofing work, for example, unless done by the general contractor, is likely to be let to two different subcontractors. Construction specifications generally list over 38 most common trade sections.⁽¹⁾

Hence, each type of construction (e.g., residential, industrial, commercial) and each kind of structure (wood frame building, fire-proof masonry structure, underground reinforced concrete sewer installation) may require a different mix of trade construction work which, in turn, will place a different demand on the set of materials

(1)

Goldwin Goldsmith, Architects Specifications, (Washington, D.C., American Institute of Architects, 1953), p. 19-2.

and services required by the trades. The number of different possible requirements placed on each trade for each kind of structure and each type of construction may indeed be large. In order to simplify the hereogeneous input requirements emanating from the trade contractors, two possible courses of action may be taken:

1) Construction industries may be disaggregated in detail by type of construction and kind of structure.

2) Trade contractors may be identified on a highly disaggregated level, the interindustry relation among the construction industries being specified and general contractors being disaggregated by major types of construction categories.

The second approach, which has generally proved to be difficult to effect, was attempted in this study.

Among the trades, emphasis was placed particularly on the different "pipe trades", the plumbers, and the electricians, SIC 1711 and 1731, respectively. These trades have witnessed significant changes in construction technology in the last two decades. They can be better identified than the other trades since they are subject to state licensing requirements and hence are more independent of the general contractor. Moreover, control estimates for their total (1) output can be better derived than for other construction trades.

The activities of other trades, such as structural steel erection SIC 1791, are generally performed by the industry producing these products and thus cannot be satisfactorily sampled. This shortcoming was accounted for in estimates of the parameters of the

(1)

For a further discussion on this point see Chapter 3.

construction industry. Other minor trades associated with the industry, but excluded from SIC Division C, Contract Construction, such as landscaping, SIC 0731, were excluded from this group.

Selection of Sample and Conduct of Survey

The nature of the requested information required a long, interview type questionnaire. It was designed on the basis of some initial interview work, and was aimed at the larger firms which could supply most of the data from their Estimating and Accounting Departments.

The survey was timed to correspond with the slowdown in the pace of the construction industry during the winter months. On the basis of crude data from County Business Patterns: 1959 by industry, the number and approximate distribution of desired interviews by 4-digit SIC were determined. Then, through the assistance of 19 construction-related trade associations in the region, some rough estimates on operating costs were obtained together with association membership lists. These lists served as a primary source in the selection of firms to be interviewed. Once the interviewing process started, reference to other firms in the industry was obtained from those interviewed.

In all cases an effort was made to interview the larger firms in the industry and obtain a sample of at least five complete questionnaires for each of the construction industries identified for this study.

Survey Response and Industry Coverage

A total of 75 firms were sampled with 39 (or 52.7 percent) of the establishments responding. Of those responding 34 (or 87.1 percent) returned complete questionnaires. Table 1 - 16 summarizes the response of the firms surveyed.

TABLE 1 - 16

SURVEY OF CONSTRUCTION INDUSTRIES:
NUMBER OF REPORTED FIRMS AND TOTAL REPORTED EMPLOYMENT

RIS Sector	Firms Sampled	Total	Firms Reporting		Total Reported Employment
			Quality of Questionnaire	Partially Complete	
			Complete		
1511	13	7	7	-	1,106
1611	5	4	4	-	443
1621	4	1	1	-	302
1711	13	9	7	2	1,145
1731	9	6	5	1	618
1701 ^a	15	5	4	1	170
172 ^b	1	-	-	-	
174	6	2	1	1	
175	1	1	1	-	
176	-	-	-	-	
177	-	-	-	-	
178	-	-	-	-	
179	7	2	2	-	
6560	16	7	6	1	255
	75	39	34	5	4,039

a

RIS 1701 represents an aggregate of all special trade contractors exclusive of SIC 1711 and 1731.

b

Sectors 172-179 are SIC sectors.

The quality of the return was generally within expectations, except for a few questions for which no consistent response or no response at all was obtained. The poorly answered questions dealt with (1) percent of work in maintenance and repair (listed under group C items in questionnaire); (2) the percent of subcontracts let to local trades (in group E); and, to a lesser extent, (3) the percent of construction work done in the region for the listed contracting agencies (in group H).

Among the home builders the poorly answered questions were (1) and (2) above, and the questions pertaining to number of lots and dwelling units built (in group H of that questionnaire). Also, the question concerning the amount of construction work by kind of improvement deeded to government (question J) was not always answered as expected.

The 39 returns, with total reported employment of 4,039, were augmented by 91 PJTS short questionnaires and by five returns obtained from other sources, mainly from reclassified manufacturing establishments. The additional returns pertained, for the most part, to firms smaller than those sampled by the RIS survey. In this way the number of questionnaires was increased fourfold, while reported employment was almost doubled. The sources of data are summarized in Table 1 - 17.

Composition of Output of Construction Industries

Table 1 - 19 summarizes the response to one question in the RIS survey, namely, the percentage of construction done for the different kinds of contracting agencies or clients. As already indicated, one of the reasons for this question was to inquire into the possibility of disaggregating some of the 4-digit SIC general contractors

TABLE 1-17

SUMMARY OF SOURCES OF DATA FOR
THE CONSTRUCTION INDUSTRIES

RIS Sector	RIS Survey		Other Sources		Total	
	Firms	Empl.	Firms	Empl.	Firms	Empl.
1511	7	1,106	19	580	26	1,686
1611	4	443	4	263	8	706
1621	1	302	4	204	5	506
6560	7	255	3	9	10	264
1711	9	1,145	17	485	26	1,630
1731	6	618	2	59	8	677
1701	5	170	47	1,802	52	1,972
Total	39	4,039	96	3,402	135	7,441

The total industry coverage obtained from both the RIS survey and from the other sources is shown in Table 1-18.

TABLE 1-18

SURVEY COVERAGE OF CONSTRUCTION
INDUSTRIES EMPLOYMENT

	Total Survey Data	Estimated Industry Total ^a	Percentage Coverage
1511	1,686	10,627	15.8
1611	706	5,020	14.0
1621	506	7,338	7.1
6560	264	7,269	3.6
1711	1,630	8,767	18.7
1731	677	3,700	18.3
1701	1,972	27,132	7.3
Total	7,441	69,853	10.6

^aSee Chapter 4 for employment estimates.

industries by type of construction. Of the seven reporting firms in SIC 1511, only two exhibited a sufficient specialization along the categories outlined to be considered for exclusion from the rest of the sample and specifically to constitute a sub-classification, manufacturing-construction work. However, since the total sample was not large enough and since the data for the two firms were subject to non-disclosure requirements, it was decided not to disaggregate the 4-digit industry SIC 1511.

The review of the trades SIC 1711 and SIC 1731 led to similar conclusions. In SIC 1711, out of the 9 responding units, at most only 2 could be classified as specializing in the construction of manufacturing plants. In SIC 1731, out of 6 responding units, only 2 could be classified as electrical sub-contractors specializing in manufacturing construction, and only 2 could be classified as serving government.

Had the response rate been higher, it might have been possible to have separately identified at least the sectors specialized in manufacturing construction.

As the data indicate, the general building contractors (SIC 1511) and plumbing and heating trade contractors (SIC 1711) derived their income only from non-residential construction. ⁽¹⁾ There is reason to assume, however, that the smaller firms surveyed by the PJTS study and which were included in our sample, did work on residential construction, thus perhaps balancing the output distribution by kind of

(1)

This fact permitted the redefinition of SIC 1511 to exclude residential construction, which was placed, in turn, with SIC 6560. See Chapter 4 for further discussion of this point.

TABLE 1-19

DISTRIBUTION OF CONSTRUCTION WORK BY KIND OF CONTRACTING
AGENCY OR CLIENT, GENERAL AND TRADE CONTRACTORS

Kind of Client	General Contractors ^a		Trade Contractors		
	1511	1611	1711	1731	1701
Government	3.7	83.3	29.9	39.7	10.5
Federal	--	4.0	10.4	1.4	n.a.
State	3.7	38.3	6.8	21.1	n.a.
Local	--	41.0	12.7	17.2	n.a.
Manufacturing	41.0	14.4	30.9	28.0	29.2
Commerce	27.0	0.7	28.8	18.8	51.4
Institutions	28.3	1.6	10.4	5.1)	8.9 ^d
)	
Other	--	* ^b	--	8.4)	
Total	100.0	100.0	100.0	100.0	100.0
Firms Reporting	7	4	9	6	5
Construction Work Done (Millions)	\$53.4	\$10.3	\$37.6	\$18.0	\$3.0

Note: No residential construction was reported by SIC 1511 and 1711 firms.

^aSIC 1621 was withheld since only one firm reported.

^bLess than one-tenth of one percent.

^cOf the 8.4 percent, 0.1 percent was residential, 2.8 percent utilities and 5.5 percent transportation.

^dOf the 8.9 percent, 7.1 percent was in residential construction and 1.8 percent Other, including institutions.

construction of the industry sampled. It is interesting to note that in all industries, except RIS 1701, the output of the large firms was mainly distributed to government and manufacturing.

Survey of Ordnance Industries

The survey of ordnance industries was limited in scope. Some establishments in these categories were difficult to identify. Other establishments experienced such large changes in the composition of output as to preclude the conduct of a survey similar to that used for the manufacturing industries. Moreover, only a few of the ordnance establishments which were listed by the manufacturing directories as operating in the SMSA in 1959 were found in the area at the time the survey was taken. Finally, some establishments that would have been classified according to census definitions in SIC 1925, Guided Missiles and Space Vehicles, Completely Assembled, were more appropriately classified with the manufacturing industries. This reclassification, based on survey returns of some of the largest establishments in the area, affected particularly SIC 3662 and SIC 3729. One of the largest establishments, with over 1000 employees, fell into the latter category.

The above considerations, together with a few non-responses, resulted in only four complete questionnaires for the SIC major group 19. Non-disclosure requirements and the difficulty in estimating industry output made it advisable to reclassify the ordnance establishments on a 3-digit SIC basis. Accordingly, two returns were classified in SIC 192, and the other two returns were classified in SIC 194. No response was obtained from the surveyed establishments in SIC 199, the third 3-digit SIC category estimated to represent

the ordnance industries in Philadelphia SMSA as of 1959. The coverage of the survey of ordnance industries is summarized in Table 1-20.

TABLE 1 - 20

ORDNANCE INDUSTRIES, EMPLOYMENT OF REPORTING
ESTABLISHMENTS AND COVERAGE

SIC Code	<u>Reporting Establishments</u>		<u>Industry Coverage (percent)</u>	
	<u>Establishments</u>	<u>Employment</u>	<u>Establishments</u>	<u>Employment</u>
192	2	155	100.0	43.7
194	2	29	66.7	12.6
199	-	-	-	-
Total	4	184	66.7	18.9

Regional Input-Output Study
Department of Regional Science
University of Pennsylvania
Philadelphia, Pennsylvania

Preliminary Draft
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Chapter 2 ESTIMATES OF INPUT COEFFICIENTS

This chapter describes the procedures used in the estimation of the input coefficients in the Philadelphia region input-output study. First, a formulation of the general problem is presented. Then problems of classification of establishments by industry, and their inputs by industry of origin are described. Estimation procedures are then discussed together with related problems of obtaining consistency checks and making adjustments in data. Also described are the procedures used in estimating the input structure of selected industries for which no primary data were available. The aggregation of selected industries and associated problems are also noted.⁽¹⁾

The methods and procedures of this chapter refer primarily to the manufacturing industries for which input coefficients were estimated first. The experience gained from this work served as a guide in estimating the coefficients of other industries. The

⁽¹⁾Extensive discussion of these various problems are available in the input-output literature. For example Wassily W. Leontief, The Structure of the American Economy, 1919-1939, 2nd Edition, (New York, Oxford University Press, 1951); Wassily W. Leontief, et al., Studies in the Structure of the American Economy, (New York, Oxford University Press, 1953); Hollis B. Chenery and Paul G. Clark, Interindustry Economics, (New York, John Wiley and Sons Inc., 1959); Walter Isard, Methods of Regional Analysis (New York, The Technology Press and John Wiley and Sons Inc., 1960); Richard Stone, Input-Output and National Accounts, (Paris, France, The Organization of European Economic Cooperation, 1961); National Bureau of Economic Research Input-Output Analysis; An Appraisal. Studies in Income and Wealth, Vol. 15, (Princeton, N.J., Princeton University Press, 1955), and Technical Supplement.

methodology described is applicable, with minor modifications, to other non-service industries, in particular extractive industries and construction.

General Estimation Procedures

The procedures employed in estimating the structural coefficients of the region's industries required the extensive and detailed collection of data and their careful evaluation in order to obtain the necessary statistics. Here problems of identification and classification of data required the review of the information obtained for each establishment in order to ascertain whether the returns actually fell within the designated SIC categories. This entailed the review of the output of each reporting establishment and its input structure relative to that of its assigned industry. Change in classification of establishments affected in turn the size of the industry sample.

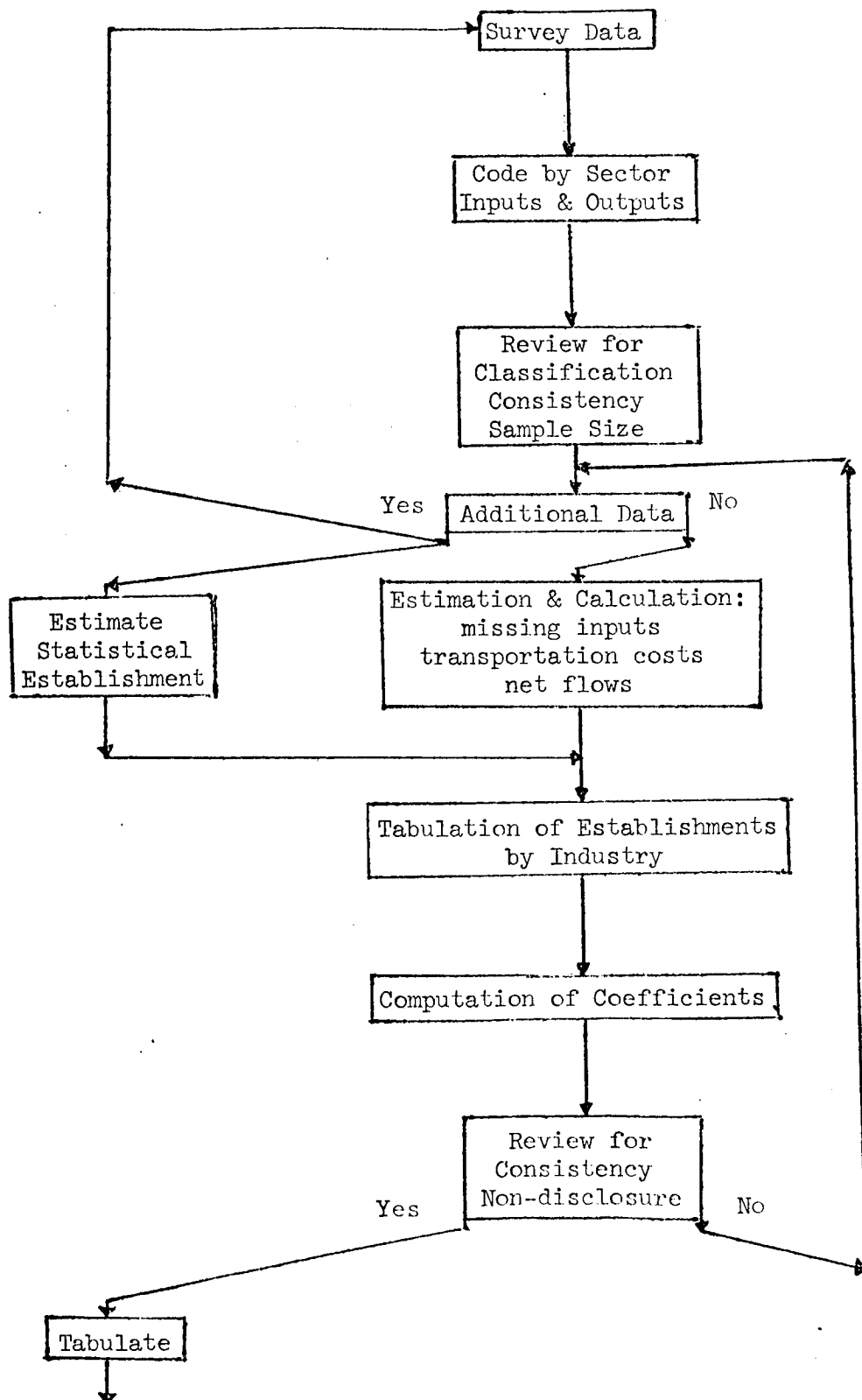
When the size of the sample obtained, its quality, or industry coverage were considered unsatisfactory, several methods were used to extend the base of the industry data. Early experience with the data, including that of the Penn Jersey Transportation Study survey, led to the conclusion that it would be extremely difficult to base the study on complete questionnaires only. Hence two major independent decisions had to be made. The first dealt with the way the base of the industry data could be expanded, either by additional sampling or by substituting data from other sources. The second dealt with the choice of the specific estimation procedure to be used.

The alternatives considered in the first major choice were whether to sample additional establishments when the response rate and the industry coverage were low, or to upgrade the sample by estimating missing entries on poor returns. The treatment of poor returns, where the data were either incomplete or where the replies were inconsistent with each other on the same form required another choice. Incomplete and poor returns could be discarded or their information augmented and verified, either by a supplementary survey or by the use of secondary sources. Another alternative was of course the sole use of secondary sources. In each case the course of action was determined by cost considerations, respondents' reactions, and the sampled representation of the larger establishments of the industry together with non-disclosure requirements.

In the second major choice, concerned with data editing procedures by which the survey data were adjusted and the coefficients estimated was affected by the above consideration, together with the availability and suitability of the various sources of data. The amount of data editing depended in part on the adequacy and accuracy of the sample, which in turn determined the extent to which estimates from other sources were added to the observations in order to adjust for refusals and response errors.

All of these courses of action were also taken within sequence and time constraints. The sequence of these procedures as applied to the prototype industry, manufacturing, is presented in a procedural flow chart, Fig. 2-1. The procedures are described in the following sections.

Figure 2-1
Procedural Flow Chart for Estimating Coefficients



Classification and Measures of Input and Output;

Manufacturing Industries

Once the questionnaires were completed in a manner described in Chapter 1, and tentatively classified in accordance with the Pennsylvania Industrial Directory and other directories for the State of New Jersey, the data on the returns were coded by 4-digit SIC and checked to verify the initial classification of establishments.

Classification of Industries

Ideally, the input-output model requires a set of homogeneous industries where each commodity is supplied by a unique industry. In practice one seeks to describe the kaleidoscopic variety of production activities in terms of a reasonably detailed classification where establishments engaged in the same or similar lines of production fall in one category. For our purposes, establishments were classified into 4-digit SIC industries.⁽¹⁾ In doing this, considerable emphasis was placed on similarity of input structure.

⁽¹⁾Executive Office of the President, Bureau of the Budget, Standard Industrial Classification Manual, 1957. (Washington, D.C., Government Printing Office, 1957).

Classification and Measures of Output

The classification of output was based on the predominant output characteristics of each establishment. The products listed on the returns were classified and grouped by the 4-digit SIC. The group which accounted for the largest portion of sales determined the industry classification. Other, secondary products to the establishment, were left as part of total output. Miscellaneous receipts were similarly treated. Thus an establishment and the corresponding industry account can include the following items in its value of shipments:

Primary products

Secondary products

Miscellaneous receipts

Contract and commission work

Repair work

Scrap and saleable refuse

Nonmanufacturing activities

Value of resale

Installation receipts

Research and development work

Other receipts

Total Output = Value of Shipments

In cases where a heterogeneous output was specified, but without a breakdown, the establishment's list of materials consumed, its labor coefficient and other related measures were used to provide additional information for classification purposes. The use of such information is described later in the text.

Secondary Products. In the Philadelphia table, all output in terms of total value of shipments of manufacturing establishments was attributed to the industry producing the primary output. No secondary output was transferred to any other industry, as has been done in previous U.S. input-output studies.⁽¹⁾ Exception to this rule was made for five establishments where each was split into two to account for heterogeneous input structures and output mixes. The sub-establishments thus created were then classified according to their input structures and output. This procedure was used where (1) there was no evidence of dominance of any primary output; (2) secondary products belonged to a different 2-digit SIC group (e.g. when chemicals were secondary products of a food producer); and (3) there was no evidence of production at fixed proportions of primary and secondary products.

Miscellaneous Receipts. Miscellaneous receipt items were not always specified in detail, and it is not known whether they were completely itemized by the respondents. Since the questionnaire dealt particularly with sales, it was assumed that some of these items may not have been associated in the mind of the respondent with the terms "sales" or "shipments". One may also suspect that some respondent specifically excluded these sources of revenue in order to assure that a low profit margin be represented on their returns. This tendency, whenever evident, was associated with medium and small establishments.

(1) Alterman, Jack and Goldman, Morris R. "Manufacturing" Input-Output Analysis: Technical Supplement. Studies in Income and Wealth, Vol. 18 (N.Y. National Bureau of Economic Research, 1954) Chapter 6, and Goldman, Morris R., Marimont, Martin L, and Vacaara, Beatrice N. "The Interindustry Structure of the United States, A Report on the 1958 Input-Output Study" Survey of Current Business, Vol. 44, No. 11, November 1964, pp. 10-29.

Contract and commission work made in one plant on materials owned by another plant was generally reported by the plant providing the materials and by the plant providing the contractual work. Here adjustments were necessary. This item of output was particularly important among the apparel industries (SIC 23) where it was necessary to make a distinction between manufacturing and contracting establishments in order to represent the proper mix of establishments in the region. See Appendix B-4 for the estimated mix of contractors and manufacturers for the area's apparel industry.

Repair work whenever listed was considered as part of the industry output. Scrap and saleable refuse was also included in the value of output. It should be noted here that data on the sale of scrap and refuse was not listed on the forms as frequently as expected. Also, eight scrap producing dummy industries were separately identified. These are described later in the text.

Value of resale, whenever listed by the respondents, was assumed to be a primary output in the absence of more detailed information to indicate that it might constitute a secondary product.

Installation receipts were included in value of shipments regardless of location of installations. When a Philadelphia firm installed its product outside the region, the installation receipts were taken to be part of its value of shipments, even though the inputs for these particular installations were obtained from firms near the site, and some labor inputs obtained near the installation site. However due to the specific nature of certain industries which install their products (e.g., elevators, generators,

fabricated structural steel), these sources of income could not be separately identified.⁽¹⁾

Research and development work, whenever listed, was assumed for purposes of classification to be associated with the establishment's primary product, in the absence of data to indicate that it might be associated with secondary products. Such work was considered a miscellaneous receipt item.

Output was measured in terms of value of shipments at producers' prices. Whenever the respondent indicated that freight out was included in his price, his reported value of shipments was reduced by the estimated transport cost.

Measures of Input

Data by establishments were generally requested for both total and detailed material inputs. The following data were collected and tabulated:

Cost of materials consumed	obtained from questionnaires
Transport cost	derived by application of OBE ratios to survey data
Heat, light and power	obtained from questionnaires
Payroll	obtained from questionnaires
Miscellaneous expenditures	obtained from questionnaires
Residual, including net revenue	derived from survey data
<hr/>	
Value of Shipments	obtained from questionnaires

Cost of Materials. Materials were valued at purchasers' prices less transport cost. Adjustments for transport costs, discussed later, were made whenever the respondent reported that they were included in the cost of

⁽¹⁾ See also Alterman and Goldman, Op. Cit. pp. 6-14, 6-15.

material listed in the questionnaire. However, no adjustments were made for trade margins. Cost of materials included inputs from agriculture, forestry and fisheries, mining and manufacturing industries. Water inputs, SIC 4941, when available, were also included. In a few instances other inputs from the service industries were also recorded.

Cost of Goods for Resale. Costs of goods for resale, which were separately identified in the Census of Manufactures: 1958, were treated as costs of materials, and in the absence of detailed information were assumed to originate in the same industry, and treated as an intra-industry transaction.

Transport Cost. Transport costs were estimated on the basis of national coefficient margins, supplied by the Office of Business Economics, Department of Commerce, applicable to the sectors of the 1958 Input-Output Study. The transport costs thus obtained were not assigned to specific transportation industries, but rather were assigned to dummy sector RIS 9842. Actual data on transportation cost, whenever available on the questionnaire, were replaced by those derived with the use of national coefficient margins in order to preserve consistency.

Heat, Light and Power. These inputs were valued at purchasers' prices and were not disaggregated by 4-digit SIC. In a later report the data will be disaggregated in terms of the inputs of coal, gas, fuel oil and electricity consumed. Since the energy inputs were not disaggregated, transport margins on coal, gas and fuel oil could not be applied. When coal and other common fuels as such were incorporated into the product, they were listed among the material inputs. Excluded from the fuel and power input data was that produced by the establishment for its own consumption.

Payroll. Labor inputs were defined essentially to correspond with the Census definition.

Miscellaneous Expenditures or Other Current Operating Expenses. These were intended to include the remainder of value added as defined by the Census of Manufactures: 1958, exclusive of depreciation allowances and net revenue. These expenses correspond to overhead costs exclusive of depreciation and depletion allowances, and can be considered as a residual cost. They were generally reported on an aggregate basis although some respondents itemized the larger expenses within the framework of their accounting systems. However, the information on this item was found to be incomplete, because: (1) respondents were reluctant to reveal their profit margins; and (2) many of the items falling in this category are generally reported by multi-establishment firms on a firm rather than on an establishment basis. For these reasons this residual cost was combined with the net revenue item derived for each industry and was presented as a lump sum RIS sector 9899.

As was noted in Chapter 1, some of the items of this category could have been separately identified. The review of the returns and normal accounting practice indicate that some important inputs could have been obtained without unduly taxing the respondents' willingness to complete the questionnaire. These include inputs originating in the following industries: communication (telephone and telegraph), insurance, real estate (rent payments), and various business services (listed in SIC 73, miscellaneous business services; SIC 81, legal services; and SIC 89, miscellaneous services). Similarly, tax payments by level of government could have been obtained. The items are important since most of them represent intermediate inputs within the framework of the Philadelphia table, and their

value of transactions are important to the accurate description of the local economy. This point will be elaborated later in the text.

Classification of Input

Generally speaking, classification procedures followed the Standard Industrial Classification Manual and the Alphabetical List of Manufactured Products.⁽¹⁾ These two publications served as a guide by which all outputs and their inputs were classified.

Particular emphasis was placed on the proper identification of the large inputs. Other input-output tables and the data available in the industry statistics of the U. S. Census on the list of materials consumed served as a guide to assure that the main material inputs were properly identified. However, it was not always possible to classify material inputs at the desired 4-digit SIC detail. This difficulty was mainly due to the imprecise description of the materials listed on the questionnaires. Hence most classification errors resulted from the disaggregation of materials into 4-digit SIC categories when the original data were specified at higher levels of aggregation. Should the table be aggregated on a 3-digit level, it is estimated that most of the errors would be eliminated, except perhaps those pertaining to packaging materials.

Certain changes in classification, however, were made. Material inputs which could not be classified or whose value was too small, generally less than .0002 of the establishment's value of shipments, were classified in a dummy industry, Unallocated Materials (Sector 39999). This sector served

⁽¹⁾ U.S. Bureau of the Budget, Standard Industrial Classification Manual (Washington, D.C. U.S. Government Printing Office, 1957)., and U.S. Bureau of the Census, U.S. Census of Manufactures: 1963 MC63-1, Alphabetical List of Manufactured Products, (Washington, D.C., U.S. Government Printing Office, 1964).

also as a residual category for all unallocated materials. Improvements in classification skills and the development of procedures to allocate aggregate inputs into their corresponding 4-digit SIC industries were evident with the progress of the study. See the example of SIC 3544, table 2-11 and related text.

Agricultural raw materials were treated similarly as other inputs and were assumed to come directly from the producing agricultural sectors classified by 4-digit SIC. In this respect the above procedure differed from the practice of OBE where agricultural products are classified on a commodity basis corresponding to the Census of Agriculture classification.⁽¹⁾

Packaging materials posed some difficult problems in classification. In the early stages of the survey no breakdown was sought, and in absence of this breakdown the respondents could not always specify their inputs in detail. Thus packaging materials which were not specified by kind were usually assumed to be made of Paperboard Containers and Boxes (SIC 265), and in the absence of further information were allocated among the 4-digit industries in that group, according to the best judgment of the staff. An effort was made to distinguish among wood, paper, plastics, glass and metal packaging materials. Nonetheless, it is judged that paper packaging materials were over-estimated in the table, while plastics, metal and wood materials were underestimated. Some adjustments for paper, paperboard, and bags and other paper products were made in order to reduce the over-estimates of demand placed upon the Paperboard Containers and Boxes industries. Similarly, the requirements from the printing industries for labels and

⁽¹⁾Goldman, Marimont and Vaccara, op cit. p. 17.

related items were understated. These requirements were often placed in the Unallocated Materials, RIS 39999.

Certain inconsistencies have crept into the study mainly because of the imprecise description of the materials used or their generic listing. For instance, on several returns, among the non-chemical industries, respondents listed "chemicals" as their input without further identification. These were generally classified as SIC 2818 or 2819, or both, depending on the nature of the industry and the output of the establishment.

Waste and scrap material inputs were assumed to come from scrap producing dummy industries designated as follows:

RIS Sector	No. of consuming Industries
9522 Scrap; rags and textiles	7
9524 Used barrels	1
9525 Waste lumber and scrap	1
9526 Waste paper and scrap	2
9530 Waste rubber and scrap	1
9533 Scrap; iron and steel	13
9534 Scrap; non-ferrous metals	6
9538 Used steel drums	1

Meat packers' waste was generally classified both as SIC 2011 and 2094. Small quantities of scrap inputs, generally of less than 5 percent of total material used were, at times, reclassified as Unallocated Materials, RIS 39999 particularly among the food producing industries. In general, the tendency was to underestimate the use of scrap in production, which in turn reduced the demand for scrap originating in those industries which are

known to produce large quantities of scrap and saleable refuse, i.e., paper, metals. While scrap inputs were assigned to the scrap industries as listed above, no adjustment was made in the output of the actual industries producing scrap and saleable refuse. At times, however, a product and its related waste product were listed together (e.g., paper and scrap paper). In these cases both products were classified according to the designation of the primary product.

Note that two of the scrap producing dummy industries were used for packaging materials, namely, barrels and steel drums. Used barrel inputs were identified for SIC 2445, Cooperage, where the input coefficient was estimated at .193689. The inputs of used steel drums were identified for SIC 3491, metal shipping barrels, drums, kegs and pails, with the estimated coefficient of .208308. This input represents 59.6 percent of total cost of materials, containers and supplies consumed. In both bases these inputs represent the reuse of the product after it has been renovated.

Review of Primary Data

Sources of Data

The large amount of data necessary to estimate input coefficients for the Philadelphia SMSA table required the use of various secondary sources of information to augment the data obtained in the survey. Both regional and national secondary sources were used. The following list indicates the major sources of data:

I. Local Data

A. Primary Sources

1. Regional Input-Output Study Survey
2. Penn Jersey Transportation Study Economic Survey

B. Secondary Local Sources

1. Department of Internal Affairs, (DIA), Commonwealth of Pennsylvania, Special Tabulations for the 5 Pennsylvania Counties in the SMSA, 1959.
2. Miscellaneous Sources including annual corporate reports, promotion and installation brochures, as well as other publications supplied by local firms, and interviews with knowledgeable persons in the industry.
3. County Business Patterns, 1959.

II. Non Local Data

A. Primary Data

1. Penn Jersey Transportation Study Economic Survey, Returns for Mercer County, New Jersey.

B. Secondary National Sources

1. U.S. Census of Manufactures: 1958
2. Office of Business Economics, U.S. Department of Commerce, 82 Sector Classification of Transport Margins
3. 192 Sector National Input-Output Table for 1947
4. Internal Revenue Service Tabulations for 1959
5. Miscellaneous trade publications and other published sources

Secondary sources were used to check the estimates derived from the survey and to help fill the missing links in the chain of coefficients which were needed for each industry. In addition, they were used to compute the necessary coefficients for those industries for which no survey data were available. Of the above secondary sources, reference was constantly made to the DIA, Special Tabulations and to the U.S. Census of Manufactures: 1958. The other sources were used to supplement these two,

and were referred to less frequently. Transport costs, as previously noted, were obtained from the OBE Special Tabulation.

Data from primary sources were reviewed to ascertain their completeness and consistency. Completeness required that missing items on the returns be identified (e.g., missing payroll inputs) and the returns classified, as to quality and potential use in estimating the coefficients. Consistency required the derivation of various ratios from the data, and their comparison with similar ratios from other sources. This comparison helped to determine whether the establishment was properly classified and inputs consistently specified.

Completeness of Returns

Since not all questionnaires were completed with full detail, it became evident that both complete and partially complete forms should be used. As was indicated in Chapter 1 and illustrated in Table 1-8, the questionnaires were classified into four grades of quality and completeness. These grades and their codes are summarized as follows:⁽¹⁾

A-type. These were complete questionnaires with all requested items filled in a satisfactory manner and where at least the principal material inputs were identified.

B-type. These were partially complete questionnaires, which listed the total cost of materials used, with no breakdown, and provided data on power, payroll and some items of the miscellaneous expenditure category. Shipments and employment were also usually given.

D-type. These were questionnaires which were designed to obtain data on the detailed material requirements of the establishment, as well as, the value of shipments and employment. At times the payroll data was also given on these forms.

⁽¹⁾ See also Chapter 1 Table 1-7.

C-type. These were incomplete questionnaires in which only a few items were given (e.g. employment and payroll). Data on materials, if listed at all, were poorly specified, generally by department or division within the establishment. These C-type returns could not be entered into the industry data without substantial adjustments and the addition of estimated entries, which in turn produced "a fictitious", or "estimated" questionnaire.

Consistency Check

Because of the varied quality of returns and possible errors in the response and the classification of establishments by 4-digit SIC codes, it was necessary to review the data and to determine whether the information was consistent. The review consisted of comparing five ratios for each establishment with corresponding ratios obtained for (1) the sample as a whole; (2) the nation's industry; and (3) the industry data for the aggregate of the five Pennsylvania counties. The five ratios were:

1. Value of shipment per employee.
2. Value of specified inputs per dollar value of shipment.
3. Cost of materials per dollar value of shipment.
4. Heat, light and power per dollar value of shipment.
5. Payroll per dollar value of shipment.

Value of shipments per employee ratio was computed for each establishment and the results compared with corresponding ratios in the sample and with the regional ratio obtained from the Department of Internal Affairs Tabulations. Consideration was given to the size of the establishment in this comparison.

Value of Specified inputs per dollar value of shipment, the dollar sum of all listed inputs to value of shipments, was computed for each establishment. All listed inputs included the cost of materials at

purchasers' value, power, payroll, and miscellaneous expenditures. It was generally expected that this ratio should fall within the 0.7 - 1.0 range, thus allowing for profits and some omissions of inputs. In cases where the ratio fell below the expected range, the data were checked to identify missing items. Where the ratio was above the range, that is, where total dollar value of inputs exceeded value of shipments the data on the questionnaire were verified with the respondent whenever possible. In general, inventory accumulations and charges allocated to headquarters of firms accounted for excessive ratios. The ratios of the various establishments were compared with that of the sample mean to identify these establishments whose ratios deviated most from this measure.

Cost of materials per dollar value of shipments was computed for each establishment and compared with that of other establishments in the sample and with the corresponding ratio derived from the 1958 Census data. This check was performed in order to verify whether the materials listed on any given form represented a complete set with no major items missing.

Whenever the total materials ratio was found to be unexpectedly low the detailed data of material inputs were compared with those of the Census, whenever available, in order to determine whether all materials were listed on the form, and to identify missing items. In many cases, however, missing items could not be identified since the list of materials on the questionnaire was more extensive than that reported by the Census. Reference to other questionnaires in the sample and other sources was then made in lieu of Census data.

Similarly, the returns were reviewed to determine whether principal material inputs were included. For some industries, where there was a doubt as to the proper classification of establishments due to their

relative heterogeneous output distribution, or to the similarity among primary outputs of two or more 4-digit industries, a further check was undertaken. The principal material inputs for each establishment were identified and their ratios to sales calculated and compared.

The comparison of the principal material input coefficients for establishments of SIC 2752 illustrate this procedure. See Table 2-2. Principal inputs which account for the largest share of the cost of materials of the establishments and which best describe the production of the industry, were identified as paper, ink and photographic supplies. Other large material inputs to this industry were identified as: SIC 2789, bookbinding; SIC 2791, typesetting; and SIC 2793, photoengraving. However, each of these inputs appeared only three times among the nine returns containing data on material inputs.

The comparison of the principal material input coefficients shows that among the paper inputs, for example, two establishments (Nos. 3 and 7) exhibited values which deviated from most industry observations. Data for these two establishments were obtained by D-type questionnaires. However, when viewing the three lowest paper input coefficients, of less than .1700, two observations were also obtained by the use of the D-type forms. Accordingly, there was no reason to assume that the D-type returns biased the data, and both returns were kept within the industry.⁽¹⁾

Heat, light and power per dollar value of shipments was computed for each establishment and compared with that of other establishments in

⁽¹⁾ If the two establishments with the seemingly excessive paper inputs were excluded, then the industry paper coefficient would have been .1774 instead of the estimated .2196, a difference of .0422 or 19.2 percent. This difference would account for $63,805,250 \times .0422 = \$2,692,580$ of direct paper requirements, as compared with the estimated input of $63,805,250 \times .2196 = \$14,011,633$.

TABLE 2 - 2

COMPARISON OF ESTABLISHMENTS' PRINCIPAL MATERIAL COEFFICIENTS,
SIC 2752, COMMERCIAL PRINTING, LITHOGRAPHIC

No.	Estab. Size Index ^a	Paper SIC 2621 (1)	Ink SIC 2893 (2)	Photo Supplies SIC 3861 (3)	Total Principal Materials (1)+(2)+(3)	Total Materials	Quality of Return
1	1.00	.1659	.0161	--	.1820	.2059	D
2	1.65	.1520	.0162	.0629	.2311	.2848	D
3	1.71	.2873	.0477	--	.3350	.3350	B+D
4	1.71	--	--	--	--	.4136	B
5	1.83	.2011	.0041	.0213	.2265	.4213	B+D
6	2.14	.1808	.0088	.0077	.1973	.3367	A
7	4.57	.3228	.0174	.0335	.3737	.4550	D
8	4.71	.1540	.0109	.0029	.1678	.1739	A
9	4.88	.1704	.0158	--	.1862	.2229	A
10	6.71	.2259	.0302	--	.2561	.4415	A
Industry Estimate		.2196	.0192	.0112	.2500	.3454	
Range		.1353	.0389	.0600	.2059	.2811	
National Ratios		.1923 ^b	n.a.	n.a.	n.a.	.3167	

^ain order to avoid disclosure, size is presented in index form, where 1.00 represents the smallest establishment with employment within the range of 10-50 employees.

^bNewsprint and all other paper and board.

the sample and with the national ratio obtained from the Census (Fuels and Electricity consumed). Generally, for most industries little difference was found to exist between the Philadelphia and the national ratios.

Payroll per dollar value of shipment was computed for each establishment and compared with that of other establishments in the sample, and with the corresponding ratios obtained from the Census and from the DIA Tabulations. It was presumed that the ratio for the local establishments would better correspond to the regional, (DIA) ratio than to the national since the regional ratio and the industry sample pertained to almost the same population, and since the regional ratio was for 1959 and the national was for 1958.

Table 2 - 3 is presented to illustrate the five consistency (ratio) checks for a selected industry, SIC 2011. See also Table 2-10 for the complete input structure of this industry.

This procedure served not only to identify missing items, but also to check upon the classification of establishments in an industry, since a large deviation from the industry mean of the five ratios checked, may also indicate a different production function characteristic of another industry.

The checks just described have also resulted in the review of classification of some establishments, the transfer of some of these to other industries, and the reevaluation of the quality of sample. In several cases it was found that the questionnaires contained incomplete lists of material and in others, certain inputs were found to be missing. In still other cases, the information was considered to be too poor for use and the returns were excluded.

TABLE 2 - 3

CONSISTENCY CHECK OF PRIMARY DATA, (COMPARISON OF THE FIVE RATIOS), SIC 2011, MEAT PACKING PLANTS

	Shipments per Employee	Specified Inputs per \$ Shipment	Cost of Materials per \$ Shipment	Heat Light and Power per \$ Shipment	Payroll per \$ Shipment
Industry Estimate ^a	\$ 61,818	.9544	.8067	.0038	.0820
Estab. - 1	121,581	.9400	.8700	.0040	.0450
Estab. - 2	111,972	.9726	.9022	.0024	.0448
Estab. - 3	51,429	.8704	.6667	.0020	.0722
Estab. - 4	48,889	.9258	.8216	.0036	.0992
Estab. - 5	38,535	.9751	.7796	.0056	.1440
Estab. - 6	33,333	.9140	.7000	.0040	.1400
Estab. - 7	31,481	.9679	.8006	.0071	.1282
Estab. - 8	28,571	.9893	.8000	.0048	.1750
Sample Weighted mean (primary data) ^b	62,312	.9489	.8059	.0039	.1030
National Ratio	59,578	n.a.	.8517	.0040	.0642
Regional Ratio	53,906	n.a.	n.a.	n.a.	.0933

^a These data represent the final estimates for the industry, based on edited data.

^b These statistics were obtained from the sample prior to adjustments for transport cost and other items.

Note: The sum of the ratios of the last 3 columns for primary sample mean, National and the Final industry estimates are as follows:

Sample Mean	.9130
National Ratio	.9199
Industry Estimate	.8925

where the industry estimate excludes transport costs.

Review of Sample Size

Once the questionnaires were reviewed for completeness and consistency of response and their quality described, it was possible to evaluate the size and quality of the sample. The sample was evaluated in order to determine whether additional questionnaires should be obtained. This decision was made in light of the estimated number of establishments in the industry, the level of cooperation in the industry and expected response rate, and budgetary considerations. In some cases, where establishments were reclassified it was necessary to repeat the survey procedures in order to obtain a minimum number of returns. Some of the returns were reclassified due to the late date 1964-1965, for which the survey data were applicable. During the period, 1959-1964, as was noted in Chapter 1, some establishments changed their line of production and consequently their 4-digit SIC classification. In other cases, due to refusals to participate in the survey or to response error, the sample obtained was too small and replacements were needed. In still other cases, due to the highly skewed size distribution of establishments in the industry, the small sample which was obtained, although it covered more than half of the employment, could not be used without disclosing the production structure of the dominant establishment. Hence additional interviewing was necessary to assure that the data for the dominant establishment would be concealed, by accounting⁽¹⁾ for less than 75 percent of the sampled industry data.

(1)

Whenever additional establishments could not be obtained a small estimated "statistical establishment" was added in order to conceal the primary data.

Small Industries The survey of small industries, those with less than ten establishments, required repetitive sampling in order to obtain the expected coverage and overcome non-disclosure requirements. (1) Here, two extreme cases were distinguished: 1) small industries with a small employment size, generally of less than 200 employees, which accounted for a small part of their 2-digit SIC aggregate employment and 2) small industries with a high percentage of employment in their 2-digit SIC group. In the first case, where a decision was made to obtain more information, D-type questionnaires were used either to augment B-type returns already obtained, or to reduce survey cost for the small industry. In the second case where the number of establishments in the industry was small, less than ten, but the total employment in the industry was relatively large, percentagewise, repeated requests for information on A-type returns were necessary in order to obtain a satisfactory sample.

Adjustments in Data in Establishments

Upgrading of Returns

Since it was not always possible to enlarge the sample by repetitive sampling, it was necessary to augment the survey data by upgrading the quality of the returns through estimates of missing items and by the construction of estimated establishments, termed "statistical establishments." This policy, which began with the use of the D-type questionnaire designed to augment the B-type return, thereby to create a complete A-type questionnaire, was extended to cover all returns. Similarly, for questionnaires obtained on long

(1)

See Chapter 1.

forms in which the list of materials was incomplete (e.g. where only one or two major items were listed), estimates of missing materials were sometimes added. In this way, the returns from the survey were upgraded to provide an expanded set of industry data for estimating the technical coefficients.

Three levels of estimation were used to upgrade the questionnaires:

Level 1 - Estimation of one or two missing items in the set of entries for an establishment. These included such items as payroll and power. Also, total material inputs on B-and D-type returns for the same establishment had to be reconciled.

Level 2 - Estimation of a missing subset of entries of an establishment. Involved was the disaggregation of materials listed at a 3-digit SIC level into 4-digit SIC industries, or the grafting of a list of materials onto an A-type return in which large aggregates of material inputs were specified (e.g. metal products).

Level 3 - Estimation of a complete (or almost complete) set of entries for an establishment. Here the creation of a fictitious "statistical establishment" was involved.

Generally, these procedures were applied at the establishment level, and estimates were computed on the establishment work sheets. They were part of the procedures used in processing the questionnaires and editing the data. See Table 2 - 4 for the schedule of upgrading procedures.

In estimating the variables on the establishment level, the corresponding industry data were sometimes used to build up the missing items. The observations thus obtained for the expanded sample

TABLE 2 - 4

UPGRADING SCHEDULE; ITEMS ESTIMATED AND ORIGIN OF QUALITY
OF RETURNS USED

Quality of Return Obtained in Survey	Level of Estimate	Estimated Items	Quality of Return Used
A	(1)	Minor adjustments	A
B+D	(1)	Minor adjustments Reconciliation of total material inputs on both returns	A
D	(2)	Completion of required entries: power, payroll, other expenditures	A
D	(3)	Various items to complete entries	A
Secondary Data	(3)	All items	A
B	(1)	Minor adjustments, mostly for transport cost	B
C	(2)	Completion of required B-type entries	B
Secondary Data	(3)	All items	B

were not necessarily independent of each other. However, in estimating the parameters for each industry, particular care was taken to assure the independence of observations among the industries for which coefficients were estimated from survey data. The exception to this procedure was in the estimates of statistical industries for which no survey data were available and where even secondary data were incomplete or unavailable.

D-type returns These returns were used in two ways. First, as was noted in Chapter 1, they were used to supplement data on the material input structure of establishments for which B-type returns were previously obtained. In this case, the total cost of materials on both forms were reconciled to conform to that specified for the nearest date to the benchmark year of the table. In this way both B- and D-type forms were combined to produce a complete A-type questionnaire. Second, D-type returns, obtained for establishments for which there were no B-type returns, were also converted into A-type returns by estimating missing items. In this case, estimates for power, payroll (when not listed) and miscellaneous expenditures were made. Transport costs, as previously noted, were estimated on all questionnaires. As was noted in Chapter 1, the use of D-type returns was mostly for small establishments. Table 2 - 5 illustrates the procedure for an establishment in one of the metal fabricating industries.

Estimates of Missing Variables

The following estimation procedures were used both to estimate variables missing on the returns and to replace inconsistent items.

TABLE 2 - 5

INPUT COEFFICIENTS OF A SIC 3499 ESTABLISHMENT
OBTAINED FROM A D-TYPE RETURN

Inputs		Information Listed on Questionnaire ^a	Transport Cost Margin	Derived Data
Code	Item			
3312	Steel	.3538	.01144	.34236
2813	Gases	.0044	.00030	.00410
2992	Oils	.0009	.00001	.00089
3545	Drill bits, etc.	.0009	.00005	.00085
	Total Materials	.3600		.34820
9842	Transport Cost (OBE based estimate)		.01180	.01180
9849	Power (estimated)			.01509
9888	Payroll (estimated)			.23819
	Other Expenditures (estimated)			.12771
	Total Input			.74099
	Residual, including profit			.25901
Total Output		1.0000		1.00000
Value of Shipments		\$40,000-60,000 ^b		
Employment		3		

^aCalculated at purchaser's prices.

^bActual value of shipments withheld to avoid disclosure.

Value of Shipments This value which determined the size of the establishment, and hence its weight in the industry data from which coefficients were estimated, was generally specified on most returns. In some cases it was given only in a general form (e.g. as exceeding a given value, or falling within a given range). In these cases shipments were estimated on the basis of estimation routines developed for this purpose.

First preference was given to local sources of data in obtaining the estimators, particularly to the 1959 DIA tabulations. The next in order of preference were statistics obtained from the sampled establishments in the same 4-digit SIC where sufficient coverage was available. Lowest in order of preference were national data, particularly the industry statistics of the U.S. Census of Manufactures: 1958.

The following describes the estimation procedures according to order of preference. When payroll data were given on the return, estimates of shipments were based on the reciprocal of the ratio of payroll to shipments. Where possible, the ratios were obtained from DIA tabulations. Hence, establishment's payroll x DIA shipments per payroll yielded the estimated value of shipments for the establishment. Whenever DIA data were not available (due to the aggregation of 4-digit SIC data to avoid disclosure), a ratio obtained from sampled establishments of similar size was used.

When payroll data were not given, or were considered inconsistent with other data for the establishment, estimates were based on employment. Preference was given to the ratio of shipments per employee obtained from DIA tabulations; but whenever this was not

available, a ratio was obtained from the sample when its coverage was satisfactory.

When neither payroll nor employment data were given, or when these data were not considered reliable for purposes of estimation of other variables, the value of total materials consumed was used as the independent variable. In this case, since no DIA data were tabulated, the reciprocal of the ratio of materials to shipments obtained from the sample was used.

Where DIA data were not available and sampled data were considered to be insufficiently representative of the industry, reference was made to the national ratios computed from the U.S. Census. These ratios were used in obtaining estimates based on payroll, employment and cost of materials.

While all of the above methods were applied, the first three were used most frequently, approximately two-thirds of the time. The fourth method, (employment)x (shipments per employee) based upon sample data, was used approximately one-quarter of the time. In addition, reference was made to the other published sources. In a few instances where it was suspected that the information on the return either under- or over-stated the true value of shipments and where value of shipments was available from published records (e.g. Moody's Industrials, annual corporate reports), a revision was made to correct the respondent's error. In a few cases this approach was also used to adjust the output of the respondent to the base year, particularly where the subsequent growth in the size of the establishment would have required compliance with non-disclosure rules.

Roughly speaking, value of shipments were estimated for slightly

under 300 establishments, including statistical establishments for which complete estimates from secondary sources were made.

Total Materials Total materials were estimated whenever this value was missing or found to be inconsistent with the input structure of the establishment and whenever the list of given materials was considered incomplete (e.g. when only paper was specified for the production of books).

Generally, estimates of total materials were based on value of shipments, multiplied by the ratio of materials to value of shipments obtained either from the sample when coverage was sufficient, or from the U.S. Census. However, due to the intricate relationships of cost of materials and contract work on the one hand, and cost of materials and payroll on the other, no consistent preference for the choice of ratios was developed. Each return was independently evaluated.

A certain tendency toward underestimation resulted in the total material estimates through the use of the Census ratios of materials to shipments. The numerator used in the ratio was that of Materials, parts, containers and supplies consumed, M the numerator excluded the cost of resales, M_r , and contract work, M_c . Hence, instead of using the ratio, $\frac{M + M_r + M_c}{S}$, where S stands for value of shipments, the ratio, $\frac{M}{S}$, was used. (1)

(1)

According to the Census, total cost of materials consists of Materials, parts, containers and supplies consumed M , plus cost of Resales, M_r , plus Contract work, M_c , plus fuels consumed and Electricity consumed P . The latter two items, P , were taken to correspond to the heat, light and power input in the Philadelphia study.

National ratios are presented for a few selected industries in Table 2 - 6 in order to illustrate the magnitude of the error generated by the use of national data. The industries where the effect of underestimating material inputs was most pronounced were those which are typified by subcontract letting and which derived a substantial portion of their value of shipments from resale of products. SIC 22, 23, 27, 35, 36, 37 and 38 were the most affected. It is estimated that, on the whole, total materials were underestimated by .0248 per dollar worth of output among the industries for which materials were estimated by the use of the Census. See Table 2 - 6.

When data on shipments were not given, total materials were estimated by the use of Census data--on the assumption that the local and national ratios of total materials to payroll plus power $\frac{M}{W+P}$ were the same. This assumption was employed only in those cases where data total materials data were missing, or where the list of materials was considered incomplete; that is, in estimation procedures identified above as Level 1 and Level 2.

When a return listed various materials without specifying their values and when these were separately estimated, the value of total material inputs was obtained as a sum of components.

Detailed Material Inputs The disaggregation of material inputs into 4-digit SIC detail required first the identification of the components of the aggregate as discussed above and, second, an allocation procedure.

Allocations followed closely the industry statistics of the

TABLE 2 - 6

ERRORS IN UNDERESTIMATING TOTAL MATERIALS
CONSUMED THROUGH THE USE OF CENSUS DATA,
16 4-DIGIT SIC INDUSTRIES

SIC	$\frac{M}{S}$	$\frac{M + M_r + M_c}{S}$	$\frac{M_r - M_c}{S}$	Actual Error
	(1)	(2)	(1)-(2)=(3)	(4)
2031	.6311	.6853	-.0307	-.0307
2062	.7980	.8036	-.0056	-.0022
2292	.4059	.4583	-.0524	-.0110
2385	.3949	.5013	-.1065	-.0533
2522	.3322	.3740	-.0418	-.0038
2815	.4595	.5035	-.0440	-.0040
3021	.3007	.3439	-.0432	-.0108
3255	.2417	.2734	-.0317	-.0022
3351	.5787	.6227	-.0440	-.0282
3431	.3414	.4154	-.0740	-.0740
3496	.3397	.4143	-.0746	-.0142
3548	.3290	.3942	-.0652	-.0652
3623	.4926	.5378	-.0452	-.0244
3662	.3978	.4510	-.0532	-.0266
3671	.1920	.2325	-.0405	-.0405
3951	.3801	.4006	-.0205	-.0062
Mean			-.0483	-.0248

Source: U.S. Bureau of the Census. U. S. Census of Manufactures: 1958, Part 2, Industry Statistics (Cols. 1, 2, and 3); and Regional Input-Output Study (Col. 4).

M=Materials, parts, containers and supplies consumed

M_r= cost of resales

M_c= Contract work

S= Total value of shipments.

(1)
U. S. Census and its supplement on materials consumed. In the absence of Census data, reference was made to other returns in the sample. When these sources were not available, trade publications and engineering reference books were used in order to determine the quantities of materials required in production, sometimes only to the extent that they could be ranked. The quantities thus obtained were multiplied by unit prices obtained from the Census industry statistics in order to derive crude estimates of dollar value of inputs. Allocations of equal amounts were used in the absence of any information, and in cases where the value of the aggregated item was relatively small.

Cost of Resales Cost of resales was calculated as the value of resales when it was reported in the questionnaire times the ratio of cost of resales to value of resales obtained from the Census. When the value of resales was not separately identified on the questionnaire yet resale items were noted without their costs, costs of resales were estimated on the assumption that the establishment's ratio of cost of resales to total cost of materials (including the cost of resale) equalled the ratio of value of resales to total value of shipments obtained from the Census.

Power Heat, light and power inputs were estimated on the basis of the establishment's value of shipments and the use of the ratio of heat, light and power costs to shipments obtained from other sources. When the available sample was large enough to be considered

(1)

U.S. Bureau of the Census, U. S. Census of Manufactures: 1958, Selected Materials Consumed (MC58(1)-7, Supplement)

representative of the industry, the sample ratio was used; otherwise, the national ratio derived from the Census was taken.

Payroll Payroll estimates were based on two ratios: (1) payroll per dollar value of shipments and (2) payroll per employee. In most cases first preference was given to the ratio obtained from the DIA Tabulation for the 5-county area. However, in some instances, DIA ratios for the City of Philadelphia were used, when they were available for Philadelphia establishments. The 5-county tabulations were then used for establishments located outside the city. This practice was particularly applicable to the estimates in SIC 23, 24, 25, 30, 31, 35, 36, 37 and 38. Thus, when the value of shipments was given on the return, the DIA derived ratios of payroll per dollar value of shipments were used. In their absence payroll was estimated through multiplying employment by the ratio of payroll per employee. When the sample was considered sufficiently large or the DIA data were not available for a particular industry, the sample ratio was used.

Whenever the DIA data were not available and the sample was not large enough, national payroll coefficients were employed. This procedure, however, was rarely used. It was applied only to those industries which had only a few establishments in the region (where the DIA data were withheld to avoid disclosure), and for which the sample was either too small or not available.

Other Expenditures Initially it was intended to identify miscellaneous expenditures as a residual cost item on the questionnaire. However, not all respondents were able, or were willing, to specify this item. Most listed a few of its components or left the question

blank. On the short Penn Jersey Transportation Study form (of B-type quality) miscellaneous expenditure consisted mostly of two items, rent and telephone costs.

Because of the poor response it was decided not to attempt a detailed allocation of the miscellaneous expenditures. In fact, one aggregate sector was employed including both the miscellaneous expenditure and net revenue. The problem of disaggregation was deferred for future research. It is worthwhile to mention, however, that an attempt was made to use IRS data for estimating the net revenue component of this residual.

However, since the IRS tabulations⁽¹⁾ are compiled on a national level and classified by a code which corresponds to aggregates of one or more 3-digit SIC industries this source could not be consistently used without difficulty. Further, as the work progressed it became evident that the data on both miscellaneous expenditures and net revenue were less accurate than the other data.

Transport and Trade Margins

Whenever possible, transactions recorded in input-output tables should be valued at producers' prices (manufacturers sales prices, f.o.b. plant), rather than in purchasers', or delivered, prices. In this way, the use of constant coefficients may be more valid, since the transactions data would not be affected by changes in the distribution pattern of the system (destinations of output).

In input-output work, much data may be given in terms of delivered

(1)

U.S. Treasury Department, Internal Revenue Service, Source Book of Statistics of Income, 1959-1960 (Statistics Division, Microfilm, Washington, D.C. 1961).

prices or in terms of an intermediate price between producers' and delivered prices. In order to net out the distribution charges of transport and trade, and to arrive at producers' prices, estimates of the component charges must be obtained. Generally, we have, for manufacturing:

	Transaction at producers' price
plus	Excise Tax
less	Subsidy ⁽¹⁾
plus	Transport Cost
plus	Trade Margins (Wholesale)
	<hr/>
Equals	Transaction at purchasers' price

Transport costs were estimated on the basis of transport margin ratios supplied by OBE. They were in lieu of locally derived estimates since local data could not be obtained at a satisfactory level of accuracy within the resources of this study. Actual data whenever available on the questionnaire were replaced by national estimates in order to preserve consistency. Wholesale trade margin ratios have been obtained locally, but the input data have not yet been adjusted for these margins where appropriate. Hence, only transport margins were netted out at this time.

(1)

Subsidies are important in the valuation of the output of some of the extractive industries and some services, and in the valuation of products entering international trade. In this study subsidies were excluded, since most subsidies which affect the transactions of the Philadelphia Table are indirect and should be reflected in the tax inputs of the various industries (e.g. shipbuilding). Excise Tax on transportation was included in the transport margin.

Adjustments for Transport Cost The procedures employed in netting-out transport cost distinguish between transport cost associated with inputs and that associated with outputs. For inputs, the OBE transport margin ratios were applied throughout. For outputs, wherever transport costs were given, together with the value of associated products sold, such were deducted from sales; otherwise, national margins were used.

In the calculation of transport costs on inputs the procedures were as follows:

1. When it was indicated on the questionnaire that transport costs were included in the cost of any material listed, the national transport margin for that material was applied. The derived transport cost was deducted from the delivered cost of the material to yield the cost of the material at producers' prices, the transport cost of the material was then added to the transport cost of all other materials to yield the estimated transport cost of the establishment. See Table 2 - 5 for an example of this procedure.

2. Whenever the respondent reported that his transport costs were not included in the cost of materials, it was assumed that the establishment paid for transport separately, from miscellaneous expenditures. Thus, the cost of materials were entered on the worksheet without adjustment, but the transport margin ratio was applied to each material in order to obtain transport cost on each material, which were summed to yield total estimated transport cost which was then recorded on the worksheet. This total estimated transport cost was then deducted from the miscellaneous expenditures to yield the corrected value for such expenditures.

3. Whenever the respondent failed to answer the question concerning the inclusion of transport costs, it was assumed that these costs were included in the cost of materials, and the first procedure was used.

In the calculation of transports costs on outputs the procedures were:

1. When it was indicated that transport costs were included in value of shipments but were not given, national margins were used. Shipments at producers' prices were then calculated and recorded and the difference between the reported and recorded values for shipments was taken as transport costs. Such costs, on both primary and secondary products, were deducted from the value of miscellaneous expenditures (and thus total expenditures).

2. When it was indicated that transport costs were not included in the reported value of shipments, no adjustment was made.

3. When there was no response to the question concerning the inclusion of transport costs, it was assumed that they were not included in the reported value of shipments. No adjustment was made.

In this way, transport costs were estimated for all industries where output was measured in terms of value of shipments. Minor adjustments in the procedures were necessary where output was measured in terms of gross receipts and cost of services.

Adjustments for wholesale margins As previously noted, wholesale margins were not deducted, the only exception being scrap inputs. These were adjusted to producers' prices by the use of national wholesale margin ratios supplied by OBE. The wholesale margins thus obtained were added to the value of miscellaneous expenditures.

Summary--Edited Establishments.

The review of the primary data, resulted in the exclusion of

some returns and a smaller total of observations among the industries. However, the upgrading of returns and the estimation of missing items produced a set of edited returns, a larger proportion of which were complete. The edited establishments together with the statistical establishments discussed below, made up the industry data used in estimating the technical coefficients.

A summary of edited establishments by 2-digit SIC is presented in Table 2 - 7. A comparison of the data in Table 2- 7 with that in Table 1 -12 , which summarizes the survey coverage, shows that the coverage of all manufacturing establishments was reduced from 15.4 to 14.5 percent and, that the coverage of employment was correspondingly reduced from 52.6 to 51.3 percent. The total number of returns decreased from 1231 to 1161. Most of the decrease occurred among the partially complete returns, some of which were transformed into complete ones.

Additions to Sample from Secondary Sources

Statistical Establishments

Statistical establishments estimated from secondary sources were added to the survey data of some industries: (1) to augment the primary data which were considered to be unsatisfactory, either due to the quality of returns, or the size and number of the reporting establishments; (2) to comply with non-disclosure requirements; and (3) to provide estimates for those industries for which no response was obtained.

Additions to poor returns Statistical establishments constructed to augment the reporting establishments in an industry were added at different proportions in accordance with the considerations

TABLE 2 - 7
SUMMARY OF EMPLOYMENT IN EDITED RETURNS AND SURVEY COVERAGE,
MANUFACTURING 2-DIGIT SIC, PHILADELPHIA SMSA, 1959

SIC	Edited Survey Returns									
	Complete		Partially		Total		Regional		Survey	
	Complete		Complete		Total		Estimates		Coverage	
	Estab	Empl.	Estab	Empl.	Estab	Empl.	Estab	Empl.	Estab	Empl.
20	59	20,993	18	2,259	77	23,252	771	52,664	10.0	44.2
21	1	7	--	--	1	7	20	4,408	5.0	0.2
22	73	8,121	25	1,672	98	9,793	490	37,125	20.0	26.4
23	91	13,668	32	3,093	123	16,761	1,008	58,310	12.2	28.7
24	16	813	6	260	22	1,073	199	3,178	11.1	33.8
25	34	2,552	5	254	39	2,806	267	7,159	14.6	39.2
26	32	8,711	11	1,727	43	10,438	233	21,892	18.5	47.7
27	57	17,494	18	952	75	18,446	999	41,104	7.5	44.9
28	44	7,399	20	12,908	64	20,307	422	33,955	14.9	59.8
29	12	11,477	--	--	12	11,477	51	15,802	23.5	72.6
30	17	4,415	5	3,348	22	7,763	151	12,773	14.6	60.8
31	22	2,238	2	52	24	2,290	103	6,352	22.2	36.1
32	51	5,717	13	2,775	64	8,492	326	14,507	19.6	58.5
33	40	13,597	10	8,884	50	22,481	203	37,032	24.6	60.7
34	92	14,325	25	1,648	117	15,973	932	43,807	12.6	36.5
35	117	28,302	21	1,125	138	29,427	790	47,927	17.5	61.4
36	49	31,322	15	7,134	64	38,456	329	56,434	19.2	68.1
37	20	35,464	6	1,987	26	37,451	108	42,113	24.1	88.9
38	29	5,652	10	2,073	39	7,725	156	13,602	25.0	56.1
39	59	2,535	4	590	63	3,125	436	10,369	14.5	30.1
Total	915	234,802	246	52,741	1,161	287,543	7,999	560,603	14.5	51.3

listed in this section. The estimated establishments accounted for 5 to 80 percent of the employment among the 4-digit SIC industries involved. Estimated establishments were generally of two kinds:

(1) those constructed from incomplete C-type returns to yield a complete but estimated establishment, and (2) establishments for which all entries were estimated from secondary sources. See Table 2 - 4 above.

In many cases where the reported employment was at 50 percent or over of the preliminary estimated employment in an industry, the procedure was to add a statistical establishment equal to the size of the remaining employment in the industry. The share of the estimated units thus obtained was 50 percent or less. This practice was particularly applied to the following industries where response rates were lower than expected: SIC 35, 36, 37, and 38 and to a lesser extent SIC 30, 31, 32, 33 and 34.

Where reported employment was small relative to the industry, i.e., less than 50 percent, a small statistical establishment was added. The following criteria for determining the size of the estimated unit were used:

1. The employment of estimated unit should equal that of reporting units.
2. The employment of estimated unit should equal the mean employment of two A-types reporting units.
3. The employment of an estimated unit should equal that reported in a C-type return.

At times, in order to improve upon the sampled data, particularly where the list of materials was considered incomplete, a small

statistical establishment based on U.S. Census data was added at about 10 percent of total employment in industry data.

Additions due to non-disclosure requirements Non-disclosure rules require that it should be impossible to identify the production structure of any reporting establishment when given the structural coefficients estimated for the industry. In order to comply with these requirements, one can either aggregate the 4-digit industries to conceal the primary data for any one, or add a fictitious or statistical establishment of a size sufficient to conceal such data. Since a major objective of this study was to obtain industry statistics on a 4-digit SIC basis, the second alternative was chosen whenever possible. The non-disclosure rules used were drawn to follow the practice of the U.S. Census, taking into account the fact that (1) transport costs were independently estimated and (2) other adjustments were made on the raw data to upgrade the information obtained from the questionnaires. The publication of sampled data was restricted:

1. when a classification contained less than three reporting establishments, or
2. when one reporting establishment represented 75 percent or more of the aggregate quantity, or
3. when two reporting establishments represented 90 percent or more of the aggregate quantity.

The size of the statistical establishment was set in light of the size distribution of the establishments in the region's industry, the nature of the reporting sample, and the resulting disclosure problem. Generally, the added statistical establishment accounted for between

10 to 30 percent of the total employment of the aggregated establishments. The procedures in constructing the statistical establishment generally followed the procedures for estimating missing items. In addition, Penn Jersey Transportation Study returns for Mercer County, New Jersey, were used. Moreover, three statistical establishments, one representing a statistical industry (in major group SIC 32), were based on primary data obtained from firms outside the region.

Statistical Industries.

Statistical establishments constructed in lieu of survey data were for those industries where 1) establishments could not be located, 2) respondents refused to fill in questionnaires, or 3) only incomplete returns were obtained. Generally, repetitive efforts at sampling were not made because of the small size of the industry. In most of these cases the industries were estimated to have one or two establishments and usually no more than six. Generally, the estimated industry employment was small, less than 200 employees, except for seven industries with employment in excess of 200 employees.

These were:

<u>SIC</u>	<u>No. of Establishments</u>	<u>Estimated Employment</u>
2086	47	1,838
2298	3	367
2519	3	249
3425	2	408
3431	3	331
3635	7	287
3671	3	2,837

The number of small industries, by number of establishments included, is presented in Table 2 - 7A. Only 2 industries with more than 10 establishments were estimated on the basis of statistical

industry data. These were: SIC 2086, Bottled and canned soft drinks and carbonated waters, and SIC 2097, Manufactured ice.

TABLE 2 - 7A

DISTRIBUTION OF STATISTICAL INDUSTRIES
BY NUMBER OF ESTABLISHMENTS

Number of Establishments in Industry	Number of Industries
1	12
2	10
3	5
4-6	4
7-9	2
10 and over	2
Total	35

The following summarizes the use of statistical establishments among the manufacturing industries. Statistical establishments were added to industry data of seventy-seven 4-digit industries. The weight of the statistical establishments in industry data, in terms of employment, is specified within ranges in order to maintain non-disclosure, and indicate the reliability of local estimates. In addition, thirty-five 4-digit "statistical industries" were (1) estimated on the basis of statistical establishments only.

(1)

Statistical establishments were also applied to 4-digit SIC industries which were later aggregated with others. These industries were excluded from this count and are discussed separately at a later point in the text.

Altogether, statistical establishments were applied to 112 out of the 348 4-digit SIC manufacturing unaggregated industries appearing in the interindustry matrix. See Tables 2 - 8 and 2 - 14 .⁽¹⁾

The Estimated Coefficients

Computation Procedures

Coefficients were estimated from all edited establishments, whether obtained from survey or estimated from secondary sources. First, transactions were totalled by kind, over all observations, in order to obtain the aggregate of inputs by type for the industry. Second, the totalled value of each input was divided by total output to derive the corresponding input coefficient for each industry.⁽²⁾

Adjustments were made in the ratios of material inputs when A-type and B-type returns were combined to insure that the coefficients summed to unity (B-type reported only total materials without breakdown). In the adjustment the material input coefficients obtained from A-type returns were expanded by a factor of the reciprocal of the ratio of total material input coefficient for both A- and B-type returns to a corresponding coefficient for A-type returns. This procedure assumed that the hypothetical material input structure of the B-type returns was similar to that of the total reported for all A-type returns and, further, that type B establishments affected only the overall magnitude of the total materials input coefficient but not its breakdown. Except in SIC 23 where first contracting and manufacturing establishments were expanded by the proportion of such establishments estimated for the region in order to preserve the industry mix. See Appendix B-4.

(1) For the detailed identification of industries with statistical establishments, see Appendix B-2.

(2) See Appendix B-3 for an example of this procedure.

TABLE 2 - 8

DISTRIBUTION OF INDUSTRIES WITH STATISTICAL ESTABLISHMENTS
BY WEIGHT IN INDUSTRY DATA, MANUFACTURING

SIC	Total Number of Industries Involved	Weight of Statistical Establishment and Code ^a					
		(a)	(b)	(c)	(d)	(e)	(f)
		.01 to .09	.10 to .24	.25 to .39	.40 to .59	.60 to .80	1.00 Statistical Industry
20	17	-	2	5	3	-	7
21	3	-	1	-	-	-	2
22	9	-	3	-	3	1	2
23	6	-	2	-	2	-	2
24	3	-	1	1	1	-	-
25	3	-	1	-	1	-	1
26	2	-	1	-	-	-	1
27	2	1	-	-	1	-	-
28	12	3	6	1	-	-	2
29	1	-	-	1	-	-	-
30	3	1	1	1	-	-	-
31	1	-	1	-	-	-	-
32	10	2	4	2	-	-	2
33	7	-	1	3	-	1	2
34	6	-	2	1	-	-	3
35	6	1	-	1	-	-	4
36	10	-	1	2	2	1	4
37	6	2	1	-	-	2	1
38	-	-	-	-	-	-	-
39	5	-	-	1	2	-	2
Total	112	10	28	19	15	5	35
Percent	100.0	8.9	25.0	17.0	13.3	4.5	31.3

^aCode designation for range of weight of statistical establishment in industry data.

Comparison of Coefficients

The estimated coefficients were frequently compared to those derived from the industry statistics of the U.S. Census and the DIA tabulation in order to detect errors of omission or of improper estimation. Table 2 - 10 presents such a comparison for industry 2011. Since it was possible to increase the number of reporting units in industry 2011, following our general practice to do so whenever possible. The coefficients for RIS 2011 are presented both before and after the increase in the number of reporting establishments. Note from Table 2 - 9 that at first, RIS 2011 data were tabulated on the basis of 2 A-type and 2 B-type returns. Subsequently 3 more A-types and 1 B-type returns were added, thus doubling the number of reporting units and employment, and enlarging the coverage from 37.0 percent to 55.2 percent of the estimated industry employment.

Consideration of Residual Coefficients

The evaluation of the magnitude of the residual coefficient provided another way to review industry input structure. Since the coefficient represents miscellaneous expenditures, net revenue and a statistical discrepancy in input specifications, it was expected to fall roughly within the .1000 to .4000 range. The industries were classified into those having a residual coefficient above and below

this range. A total of 32 sectors were found to have a coefficient exceeding the expected range. The following is their distribution
(1)
by size of coefficient:

	<u>No. of Sectors</u>
.5000 and over	8
.4500 - .4999	5
.4000 - .4499	19
	<u>32</u>

TABLE 2 - 9

EXTENT OF COVERAGE IN ESTIMATING INPUT COEFFICIENTS
IN FIRST AND SECOND TABULATIONS, SIC 2011

<u>Establishments' Employment Rank</u>	<u>1st Tabulation</u>	<u>2nd Tabulation</u>
A-Type Returns	2	5
B-Type Returns	2	3
Establishments, Reporting Percent of Region	4 6.1	8 12.3
Employment, Reporting Percent of Region	1,423 37.0	2,121 55.2
Value of Shipments, Reporting Percent of Region	\$66,415,000 32.1	\$131,115,000 63.3

The eight sectors in the first group above consist of seven industries with statistical establishments. In addition, the group includes an aggregated sector, 2830. In the second group, (of five sectors), the coefficient of one industry, SIC 2342, was based on

(1)

The eight sectors of the first group were: 2073, 2097, 2318, 2830, 3296, 3421, 3564 and 3623. The five sectors of the second group were: 2085, 2342, 2813, 3291, and 3544.

TABLE 2 - 10

COMPARISON OF STRUCTURAL COEFFICIENTS, SIC 2011

RIS Code and Item	Philadelphia SMSA RIS Data		U.S. Census Data		Pennsylvania 5-County (DIA) Data
	1959		1958 ^a	1959 ^b	1959 ^c
	1st Tabulation	2nd Tabulation			
0143	.691890	.707403	.694914		
2011	.129875 ^d	.089727 ^d	.062705		
2651	.010854	.007690			
2819	.003665	.001841			
39999 Misc. Materials			.063962		
Cost of Resales Total Materials	.836284	.806661	.851739	.843336	
Trans. Cost	.024770	.024409			
Power	.004416	.003837	.004024		
Payroll	.109707	.081984	.064210	.093311	.095740
Residual	.024823	.083109	.080027		
Value of ship- ments	1.000000	1.000000	1.000000	1.000000	1.000000

^a U.S. Bureau of the Census, U.S. Census of Manufactures: 1958, Vol. 2, Industry Statistics.

^b U.S. Bureau of the Census, Annual Survey of Manufactures: 1959-60.

^c Pennsylvania Department of Internal Affairs, Special Tabulations.

^d Cost of resales were included in SIC 2011, as an intra-industry transaction.

statistical industry data, and statistical establishments were added to two other industries. However, 2 industries represent purely derived local coefficients with one industry, SIC 3544, based on one of the largest number of returns obtained (10 A-type and (1) 5 B-type). The review of the available data for these industries suggested that perhaps not all producing inputs were specified and that some were included in the residual.

Industries with a residual coefficient of less than .1000 were also evaluated. A total of 14 such sectors were identified and (2) classified by size of coefficient as follows:

	<u>No. of Sectors</u>
Less than .0600	6
.0600 - .0999	8
Total	<u>14</u>

The review of data revealed that the number of returns for these industries was small. In 2 industries, one in each of the two groups, statistical establishments were added to conceal the data due to non-disclosure requirements. In some of the other industries the data obtained in the study and the Penn Jersey surveys were poor and required the estimation of missing inputs. An exception is industry 3499 with one of the largest number of returns obtained: 11 A-type and 3 B-type. These returns represent several small establishments operating on a contractual basis. A further review

(1) See Table 2 - 2 for the input structure of SIC 3544.

(2) The six industries of the first group above were 2013, 2015, 2254, 2297, 3142, and 3621.

of the data suggests that for some of the industries the data seem fairly reasonable in light of their cyclical position in 1959, when, for example, the textile industries falling in this category (SIC 2254, 2256, 2297) were known to suffer from competition from other industries and from abroad. Similarly, industry 2431, Millwork plants, was known to be affected by the slowing down of the construction pace.

Input Structure

Table 2-11 gives a typical input structure for an industry for which there was a large number of reporting establishments. The industry is SIC 3544, Special dies, tools, die sets, jigs and fixtures. The estimates were based on the following data:

	<u>Establishments</u>	<u>Employment</u>
A-type returns	10	214
B-type returns	5	151
	—	—
Total industry data	15	365
Industry's population	183	1942
Coverage (percent)	8.7	18.8

Although the employment coverage was below the desired limit of 25 percent, the fifteen reporting establishments constituted a sufficiently large base from which to derive the estimates, particularly since the industry is characterized by small establishments. The estimated regional mean employment size of the industry was 10.6 persons, with 85.5 of the establishments falling in the 1-19 size range. It is an industry primarily engaged in contract work in its tool and die shops whose output constitutes a variety of tools, components and molds, sold mostly for intermediate use in production.

In fact, the output of SIC 3544 was identified as input into 30 industries in the Philadelphia intermediate matrix. Accordingly, its input structure is typical of contracting industries, characterized by small total materials input coefficient (.103196), and large payroll coefficient (.415607). The industry data revealed the material inputs from 22 separate industries supplying various metals and metal products, glass, plastics and other products. See Table 2 - 11.

As was previously noted, it was not possible to identify all inputs. Accordingly Sector 39999, Unallocated material inputs, account in this industry for 3.6 percent of total materials and represents the 7th largest material input.

The crudest procedures were used in SIC 20, the first major group estimated. Although some of the industries were later corrected on the basis of experience, some were left unadjusted, due to data limitations and cost considerations. Hence, for example, the material input structure of SIC 2062, Cane sugar refining, consisted of only 3 inputs:

<u>Input Industries</u>	<u>2062 Coefficients</u>
0119	.661169
2046	.001553
39999	.022488
Total materials	<u>.685210</u>

Similarly, for industry SIC 2086, Bottled and canned soft drinks which, as previously noted, was estimated on the basis of statistical industry data from Census data, the material input structure was composed of 3 inputs:

TABLE 2 - 11

INPUT STRUCTURE OF SIC 3544, SPECIAL DIES
AND TOOLS, DIE SETS, JIGS AND FIXTURES

	Input Industries' Code	Estimated Coefficients	Percent of Total Material Inputs
1	3316	.043650	42.30
2	3621	.013894	13.46
3	3352	.010129	9.82
4	3566	.009219	8.93
5	3312	.008461	8.20
6	3452	.003708	3.60
7	39999	.002948	2.86
8	3229	.002630	2.55
9	3321	.001814	1.76
10	2821	.001727	1.67
11	2819	.001306	1.26
12	3079	.000951	.92
13	3541	.000636	.62
14	3291	.000613	.59
15	3351	.000407	.39
16	3479	.000273	.26
17	3352	.000217	.21
18	3362	.000217	.21
19	2911	.000189	.18
20	3544	.000099	.10
21	2652	.000081	.08
22	3361	.000027	.03
Total Material Inputs		<u>.103196</u>	<u>100.00</u>
	9842 Transport Cost	.003735	
	9849 Heat, light and power	.008883	
	9888 Payroll	.415607	
	9899 Residual	<u>.468579</u>	
Total Value of Shipments		1.000000	

<u>Input Industries</u>	<u>2086 Coefficients</u>
2062	.063645
2095	.135005
39999	<u>.181295</u>
Total Materials	<u>.379945</u>

On the other hand, more and more detailed specifications of inputs were achieved as the work progressed and particularly among industries characterized by the assembly of components and parts produced by other industries. For example, it was possible to estimate 48 separately identified material input coefficients for SIC 3662, Radio and television transmitting, signalling, and detection equipment and apparatus. Similarly, 70 material input coefficients were estimated for SIC 3721, Aircraft.

Aggregation of Industries

As was noted in Chapter 1, industries were identified on the basis of the SIC Manual, with economic divisions, or subdivisions, identified at different levels of classification. However, since it was not always possible to obtain satisfactory estimates for each category at the desired level of classification, some industries were combined with others. The aggregate sectors thus obtained were weighted by employment in each category in order to preserve the industry mix. (1) Whenever possible, industries were aggregated

(1)

In a few sectors where a small industry was combined with a large one and the latter's data required concealment for non-disclosure, the employment of the small industry was expanded by a factor sufficient to conceal the large industry's data.

within the same higher order classification, i.e. 4-digit SIC industries were aggregated within their 3-digit classification code. Similarly, the sectors were defined so that they can be generally aggregated into the OBE sectors of the national input-output table (1) for 1958.

In manufacturing, where industries were identified on a 4-digit SIC basis, aggregation generally took place by combining an industry for which no satisfactory estimates could be obtained, with a neighboring 4-digit SIC category when their sources of input were generally similar and their output served similar markets. Frequently, however, the industry requiring aggregation was combined with the miscellaneous industry within the same 3-digit class. Manufacturing industries were aggregated when:

1. Local data could not be obtained for a small industry without excessive cost; and industry statistics of the U.S. Census were either unavailable or were not specified with sufficient detail to permit the satisfactory construction of statistical industry coefficients; or

2. Disclosure rules required the concealment of data in the case of a small industry, or

3. Industry control estimates could not be made on a 4-digit level, or when there were difficulties in classification of establishments in the region because of integrated production (e.g. SIC 2873 and 2879 were aggregated for this reason).

(1)

See Chapter 1 on levels of disaggregation and general approach to sectoring.

In all, thirty 4-digit SIC manufacturing industries were aggregated into 12 sectors. The 12 sectors represent 2,342 employees, or 4.52 percent of the estimated manufacturing employment in the region.⁽¹⁾

Number of Manufacturing Sectors

The following summarizes the extent of estimation of industry coefficients and indicates the number of industries estimated from local data only. As was noted previously, out of the 424 4-digit SIC manufacturing industries listed in the SIC Manual, 378 industries, or 89.15 percent, were identified as existing in the Philadelphia SMSA in 1959. Of those identified, coefficients were estimated for 348 industries on a 4-digit SIC basis, or for 92.06 percent of the region's industries. The remaining 30 industries were aggregated into 12 sectors. Hence, coefficients were estimated for $348 + 12 = 360$ manufacturing sectors. See Table 2 - 13. These sectors accounted for 72.3 percent of the total number of sectors in the input-output matrix. See Table 1 - 7.

Of the 348 industries estimated at the level of 4-digit SIC, 236 industries, or 67.8 percent, were estimated from local survey data only. The other 112 industries consisted of two groups; those with statistical establishments added to survey data; and those which were estimated solely on the basis of statistical industry data.⁽²⁾

See Table 2 - 14 for a summary statement.

(1)

See Appendix B-5 for the composition of the aggregated sectors.

(2)

See Table 2 - 8 and corresponding discussion and text.

TABLE 2-13

MANUFACTURING: NUMBER OF INDUSTRIES IDENTIFIED, INDUSTRIES
ESTIMATED ON A 4-DIGIT SIC LEVEL, INDUSTRIES AGGREGATED,
AND TOTAL NUMBER OF SECTORS PHILADELPHIA REGION INPUT-OUTPUT
MATRIX, 1959

2-Digit SIC Code	Number of 4-Digit Industries Listed in <u>SIC Manual</u>	Number of 4-digit SIC Indus- tries Identified in Region			Number of Aggregate Sectors	Total Number of Sectors in Matrix (3)+(5)
		Total	Estimated on 4-Digit SIC Level	Aggregated		
	(1)	(2)	(3)	(4)	(5)	(6)
20	45	37	31	6	2	33
21	4	3	3	-	-	3
22	29	28	28	-	-	28
23	33	33	33	-	-	33
24	13	10	6	4	1	7
25	12	12	12	-	-	12
26	16	14	12	2	1	13
27	16	16	16	-	-	16
28	31	25	21	4	2	23
29	5	4	4	-	-	4
30	5	5	5	-	-	5
31	10	9	9	-	-	9
32	27	24	24	-	-	24
33	24	21	17	4	2	19
34	27	26	26	-	-	26
35	40	37	33	4	2	35
36	33	28	26	2	1	27
37	16	12	12	-	-	12
38	11	9	8	1 ^a	-	8
39	27	25	22	3	1	23
Total	424	378	348	30	12	360

^aSIC 3851 was aggregated with the 3 industries in SIC 39.

TABLE 2-14

MANUFACTURING: NUMBER OF INDUSTRIES ESTIMATED ON A 4-DIGIT SIC BASIS:
 FROM LOCAL SURVEY DATA ONLY, WITH STATISTICAL ESTABLISHMENTS ADDED
 TO SURVEY DATA, AND FROM STATISTICAL INDUSTRY DATA.

2-digit SIC Code	Total (1)	Local Survey Data Only (2)	With Statistical Estab. (3)	Statistical Industries (4)
20	31	14	10	7
21	3	-	1	2
22	28	19	7	2
23	33	27	4	2
24	6	2	3	1
25	12	9	2	1
26	12	10	1	1
27	16	14	2	-
28	21	9	10	2
29	4	3	1	-
30	5	2	3	-
31	9	8	1	-
32	24	14	8	2
33	17	10	5	2
34	26	20	3	3
35	33	27	2	4
36	26	16	6	4
37	12	6	5	1
38	8	8	-	-
39	22	17	3	2
Total	348	235	77	36

The preceding material can be summarized for the manufacturing industries as follows:

<u>4-digit SIC industries</u>	<u>Number of Industries</u>	<u>Percent of Total Identified</u>
Estimated from local survey data only	236	62.43
With statistical establishments added to survey data accounting for the following percentages of industry employment	77	20.37
(a) 1-9	10	2.64
(b) 10-24	28	7.41
(c) 25-39	19	5.03
(d) 40-59	15	3.97
(e) 60-80	5	1.32
Statistical Industries (f) 100	35	9.26
Aggregated with others	30	7.94
Total identified in Philadelphia SMSA	378	100.00
Not in region	46	
Total listed in <u>SIC Manual</u>	424	

As the above tabulation illustrates, it was possible to estimate coefficients from local survey data for 62.33 percent of the 4-digit SIC manufacturing industries. Response errors, coverage and non-disclosure requirements, and the number of the small industries (less than 10 establishments) limited this percentage. There is reason to believe that for smaller areas the percentage of industries for which data can be obtained from local and particularly primary sources will be smaller.

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Department of Regional Science
University of Pennsylvania
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Chapter 3

ESTIMATES OF INPUT COEFFICIENTS: MINING, CONSTRUCTION AND ORD NANCE INDUSTRIES

GENERAL

The estimates of the structural coefficients of the mining, construction and ordnance industries described in this chapter were made after the manufacturing coefficients were derived. The experience with the manufacturing industries served as a guide in developing the procedure for mining and construction. However, the particular nature of the mining and construction industries and the limited secondary data available for comparison required some further modification in the estimation approach.

In the approach to the estimation problem and in the computational procedures, the major differences between the manufacturing industries and mining and construction were as follows:

- 1 While the manufacturing industries (major groups 20 to 39) were treated as a homogeneous group where each industry was distinguished from others only in terms of its unique output and input structure, the mining and construction divisions were further subdivided into groups of industries in order to point up unique characteristics of each group. Hence, among the construction industries the group, general contractors, was treated separately from the group, special trade contractors; and among the mining activities the group serving the construction industries was separately identified from the other mining activities.

2. Whereas in the manufacturing industries the disaggregation on a 4-digit SIC basis was rigidly maintained, sometimes at a sacrifice of more complete survey information for industries of larger size, for mining and construction this disaggregation requirement was relaxed.¹ Instead, only the more important local 4-digit SIC industries were separately identified. The other industries were aggregated into a residual category for each industry group. In mining, Sector 1490, Mining, n.e.c., and in construction, Sector 1701, Special Trade Contractors, n.e.c., were so defined. Industries which were aggregated into the residual group comprised: a) those considered as small industries (with a few establishments and employment of generally less than 200); b) those for which no satisfactory secondary data were available for checking our survey-based estimates; and c) those for which industry controls could not be satisfactorily estimated. Such aggregation, in turn, made it possible to obtain a better industry coverage for the identified industries (within the resources available for the study of these economic divisions), and reduced the need for computational procedures to overcome non-disclosure requirements.

3. Data on purchased services, which were not collected for the manufacturing industries, were obtained for the mining and construction industries (as well as for all other sectors analyzed subsequently). As a result, mining and construction contain an additional set of purchased particularly from the economic divisions of finance, insurance and real estate and services. This increase in coverage of purchases, in turn, reduced the value of residual

¹See Chapter 2 for the coverage of small manufacturing industries particularly Table 1-12, and also for the use of statistical establishments to estimate input structure for the small industries.

input category (sector 9899), and allow a somewhat more homogeneous valuation of primary inputs than in the case of manufacturing.

4. Since for survey purposes the classification of construction activity followed the SIC code, it was necessary to adjust the output of the general contractors (Sectors 1511, 1611, 1621 and 6560) which deliver directly to final demand. The redefinition of the sectors of general contractors required the revision of the survey-based estimated coefficients. This step was closely tied with the estimates of total output of the sectors listed above, as is described in Chapter 4.

The Mining Industries

Measures of Input and Output

Output. The output of the mining industries was specified in terms of total value of shipments valued at f.o.b. establishments' prices (whenever possible). In this respect the measure of output corresponds to that defined by the U.S. Census of Mineral Industries as Value of Shipments and Receipts.¹

Consequently, the output of the mining industries was defined to include the following:

Value of primary products

Value of secondary products

Miscellaneous receipts

Contract work done for others

Value of products resold without processing

Although output was defined to include the value of resale, respondents

¹U.S. Bureau of the Census, U.S. Census of Mineral Industries: 1958, Vol. 1, Industry Statistics (Washington:U.S. Government Printing Office, 1961) Introduction.

did not list items purchased for resale; hence it was assumed that the SMSA firms did not sell products which they did not mine or process.

The mining industries were defined to include only mineral industries and excluded mining operations of manufacturing firms. In the large metropolitan areas one generally finds a few large integrated firms which combine the extraction of stone, sand and gravel with the production of associated building materials; and they may also, as construction subcontractors, produce a secondary output which is primary to contract construction and particularly to the special trades. Due to the unique locational requirements of such firms, their establishments may contain a mining and a manufacturing operation at one and the same site. This juxtaposition precluded the splitting up of accounts of the individual establishments in a manner suitable for this study.¹ Such plants were classified in the manufacturing industries. As a result, the output of the mining industries identified in this study was more homogeneous than if the establishments of the integrated firms were included, and as a consequence, the total mineral output is smaller.

Although the output of the identified mineral industries was considered fairly homogeneous, no detailed breakdown of its composition was available. This point is to be noted, particularly since the output of SIC 1441, Sand and gravel, was known to contain some secondary products including ready mix concrete, which is generally valued at purchasers' prices. However, no adjustment in the industry's output was made.

¹ Similar problems were encountered in the compilation of the Census of Mineral Industries: 1958, op. cit. See Introduction and related footnotes for area statistics, particularly for counties.

Input. As already noted, input data were requested for the following:¹

Cost of materials

Other operating expenses

Wages and salaries

Materials were valued at purchasers' prices less transport cost. The adjustment for transport cost on the basis of OBE transport margin ratios followed the procedures used for the manufacturing industries. See Chapter 2.

Heat, light and power inputs were also valued at purchasers' prices less transport cost since it was possible to obtain input data on gasoline, oil and electricity purchased. In this respect the identification of the heat, light and power inputs for the mining industries presented a departure from the method applied to the manufacturing industries.

Labor inputs were defined to correspond with the Census of Mineral Industries' definition of total wages and salaries.

Data for the other operating expenses pertained to purchased services. Rental or lease of real estate and rental or lease of equipment were separately identified. Rental or lease of equipment was assigned to the special trade contractors aggregated in sector 1701, since at least two large establishments in Sector 1701 were known to supply excavating and related equipment to the construction and related mining industries in the area.

1

As indicated in Chapter 1, truck operating expenses were collected for purposes of comparison only. They were excluded from the industry data used in estimating the coefficients.

Review of Primary Data

By Input Groups. The information obtained from each return was tabulated on work sheets by input groups, where all like items were grouped under one heading. This procedure was used to ease the coding of inputs by the SIC code; it also provided workable controls in the evaluation of data, and facilitated the estimation of 4-digit SIC inputs when survey data were incomplete and contradictory, particularly with respect to inventory.

The following input groups were used:

1. Cost of materials.
2. Transport costs (obtained by applying OBE transport margins to material inputs)
3. Power and energy purchases (inclusive of heat and light)
4. Other operating expenses
5. Equipment operating expenses
6. Wages and salaries
7. Residual (output less listed inputs, items 1 through 6)

Output = Value of shipments and receipts

The variations among the input groups within an industry, when due consideration was given to establishment size, were generally within expected ranges. Returns which exhibited a pronounced deviation from the industry mean were reviewed for possible improper recording of inputs, or their absence.

Equipment operating expenses were found to constitute an important input group. They were estimated at 7.3 percent for SIC 1411, 5.4 percent for SIC 1421, and 1.6 percent for SIC 1441. The detailed

expenses were later combined with like expenses in other groups to yield the required 4-digit SIC input coefficients. The input group coefficients of sector 1421, for which the largest number of returns was available, are presented in Table 3-1.

TABLE 3-1

INPUT GROUPS OF SECTOR 1421, CRUSHED AND BROKEN STONE

Input Group	Input Group Coefficient
Cost of Materials	.0761
Transportation Costs	.0047
Power and Energy Purchases	.0542
Equipment Operating Expenses	.0544
Other Operating Expenses	.0686
Wages and Salaries	.2106
Residual	<u>.5314</u> 1.0000

By Detailed Inputs. Due to the pre-listing of inputs on the questionnaire data were obtained for most of the input items. The major exception was in Sector 1441, Sand and gravel, where no explosive inputs (Sector 2892) were given by the respondents. These generally were minor, constituting 10 percent or less of total material inputs. Purchased services, on the other hand, when added to those pre-listed on the questionnaire, generally constituted a higher percentage of output than other material inputs added by respondents. However, since data on purchased services were not requested at the same level of detail as data on cost of materials, respondents tended to under-report purchased services.

Adjustments in Industry Data

Adjustments in industry data were avoided as much as possible. With two exceptions, no imputed inputs were estimated. The one exception occurred when missing input values for the two PJTS returns (one in SIC 1421 and one in SIC 1441) had to be imputed. These imputed values were estimated on the basis of RIS survey returns for the respective industries. The other exception was in estimating transport cost as already noted.

Statistical Establishment. Since only one return was available for sector 1490, Mining n.e.c., which was for SIC 149, a statistical establishment was added. The addition was considered advisable in order to reduce the unique input characteristics of the sole return which may not represent the sector 1490 (which comprises more than SIC 149) and also to conceal the information which may be unique to that SIC category. The data for the statistical establishment were based upon a combined input structure for sectors 1411, 1421 and 1441. It was assumed that a statistical establishment based on these 4-digit SIC industries could also represent other industries in the SIC 14 major group.

The Estimated Coefficients

Computation procedures to obtain the estimated industry input coefficients followed the procedures used for the manufacturing industries. Total industry input data, including the adjusted entries, were divided by total reported industry output. Inputs associated with equipment operation expenses were allocated to the respective producing industries. This allocation affected particularly the power and energy inputs.

Principal Intermediate Inputs. The comparison of the principal intermediate input coefficients (coefficient equal to or greater than .001) among the four mining industries is presented in Table 3-2.

TABLE 3-2

PRINCIPAL INTERMEDIATE INPUTS (OF 0.001 AND OVER)
OF THE MINING INDUSTRIES

PRODUCING SECTOR	CONSUMING SECTOR			
	1411	1421	1441	1490
1509 Construction maintenance and repair	.0730	.0544	.0161	.0426
2892 Explosives	.0074	.0272	-	.0169
2911 Petroleum refining	.0669	.0499	.0204	.0445
2992 Oils and greases	*	.0176	.0051	.0097
3317 Steel pipes and tubes	-	-	.0039	*
3429 Hardware, n.e.c.	.0030	.0021	.0069	.0074
3532 Mining machines and equip.	*	.0060	.0048	.0092
3566 Transmission equip.	-	.0018	-	*
4811 Telephone	.0059	.0044	.0038	.0040
4911 Electric companies	.0011	.0252	.0297	.0125
6301 Non-life insurance	.0158	.0065	.0184	.0201
6590 Real estate, insurance and agents	.0372	.0075	-	.0084
7300 Business services	-	.0502	-	.0056

* Indicates an input of less than .001 of output

The data indicate that purchases of principal intermediate inputs were generally similar for the mining industries in the SMSA. Purchases from sectors 1509, 2892, 2911 and 4911, tended to account for a few cents per dollar output. Purchases from sectors 2992, 3429, 3532 and 4811 tended to account for 1 mill to one cent per dollar of output.

On the other hand, Insurance (sector 6301), Real estate (sector 6590), and Business services (sector 7300) exhibited larger variations among the industries, probably due to the incomplete specification of these inputs. This incomplete specification can be attributed to either the production structure of the industry as reflected in the sample, or to the fact that these purchases are generally assigned to the central head offices of branch establishments.

The comparison of the power and energy input coefficient of the three mining sectors in the region with corresponding national data on fuel and electricity purchase from the Census of Mineral Industries, 1958, reveals small differences. See Table 3-3.

TABLE 3-3

COMPARISON OF POWER AND ENERGY, AND PAYROLL INPUT COEFFICIENTS BY SOURCE OF ESTIMATE, SELECTED MINING INDUSTRIES IN SIC MAJOR GROUP 14

Source	SIC 1411	SIC 1421	SIC 1441
<u>Power and Energy</u>			
Philadelphia SMSA, RIS estimate, 1959	.0680	.0751	.0501
National estimate, U.S. Census, 1958 ^a	.0521	.0589	.0703
National estimate, 1-0 Table, 1947 ^b	.0969	.0592 ^c .0710 ^d	.0894
<u>Payroll</u>			
Philadelphia SMSA, RIS estimate 1959	.5089	.2106	.3905
Selected SMSA Counties, U.S. Census, 1958 ^e	.2481 ^f .3170 ^g	.2734 ^h	.2487 ⁱ

National estimate, U.S. Census, 1958 ^a	.4489	.3058	.3073
National estimate, 1-0 Table, 1947 ^b	.4127	.4067 ^c .3992 ^d	.3246

a) U.S. Bureau of the Census, Census of Mineral Industries: 1958, Vol. II Area Statistics (Washington, D.C., U.S. Government Printing Office, 1961), Summary Statistics, Table 2, p.22.

b) Jack G. Faucett, "Mining, Fuel and Power", Chapter 7 in Input Output Analysis, Technical Supplement (New York: National Bureau of Economic Research, Inc. 1954) Table 3. Note that the input coefficients were based on data for earlier years than 1947.

c) 1947 Sector 1-0 1420, Crushed and broken stone

d) 1947 Sector 1-0 1422, Crushed and broken limestone

e) U.S. Bureau of the Census. op cit. County statistics for Pennsylvania and New Jersey counties in Philadelphia SMSA.

f) Estimate based on 8 establishments including one classified in SIC 149. Data for Chester County, Pa., and Burlington Co., N.J.

g) Estimate based on 3 Chester Co., Pa. establishments.

h) Estimate based on 19 establishments in Chester and Montgomery Counties, Pa.

i) Estimate based on 9 Bucks Co., Pa. establishments.

Comparing the locally estimated power input and the 1958 national power and energy inputs with those developed for the 1947 Inter-industry Relations Study¹, one observes the decline in the cost of power over the years for the nation as a whole.

¹ Jack G. Faucett, "Mining, Fuel and Power", Chapter 7 in Input-Output Analysis: Technical Supplement, Conference on Research in Income and Wealth (New York: National Bureau of Economic Research, Inc. 1954), Table 3. Note that in the 1947 study there are two sectors which correspond to SIC 1421 (crushed and broken stone). One sector is 1-0 1421 Crushed and broken stone; the other is 1-0 1422 Crushed and broken limestone.

Payroll Coefficients. Some incomplete data on payroll for the SMSA establishments were available from the Census of Mineral Industries, 1958. These were compared with the payroll input coefficients estimated from the survey returns. Since the Census reported statistics by county are generally highly aggregated, it was not always possible to identify the industries' expenditure data on a 4-digit SIC basis. Hence, data for selected counties, where detailed specifications were available, were used for comparison. The comparison was also made with the national Census statistics for 1958 and the 1947 interindustry study. See Table 3-3.

Comparison of the data indicates that the payroll coefficients for RIS sector 1411 was possibly overestimated, particularly in view of the data for the selected counties in the SMSA. Similarly, the sector 1441 payroll coefficient appears overestimated. On the other hand, for SIC 1421 where the number of survey returns was largest, the payroll coefficient was considered reasonable, particularly since the coefficient obtained for the five Chester county establishments was .1995.

Summary of Input Structure

The estimated input structure of the SMSA mining industries summarized by aggregates of economic divisions is presented in Table 3-4.

TABLE 3-4

AGGREGATED INPUT STRUCTURE BY ECONOMIC DIVISION GROUPS,
MINING INDUSTRIES, PHILADELPHIA SISA, 1959

2-Digit SIC Producing Industry Groups	1411	1421	1441	1490
15-17	.0730	.0544	.0161	.0426
20-39	.0796	.1051	.0453	.0891
40-89 ^a	<u>.0608</u>	<u>.0986</u>	<u>.0531</u>	<u>.0527</u>
Total Intermediate Inputs	.2134	.2580	.1145	.1844
Payroll (Sector 9888)	.5089	.2106	.3905	.5137
Residual (Sector 9899)	<u>.2776</u>	<u>.5314</u>	<u>.4945</u>	<u>.3020</u>
Total	1.0000	1.0000	1.0000	1.0000

a) Transport costs and purchased electricity were included in this group. Purchases of gasoline and oil were included with the manufactured inputs (SIC 20-39).

Note: Detail may not add to total due to rounding.

The review of these estimates and their comparison with available data indicate that intermediate inputs were generally underestimated, whereas payroll was possibly overestimated for some sectors. Specifically, the estimates indicate that purchases of materials and supplies comprised from 4.5 to 10.5 percent of the industries' output.¹

¹Corresponding estimates for materials and supplies, exclusive of fuel and purchased electricity, for the 1947 interindustry study were: 12.2 percent for dimension stone (SIC 1411); 20.5 percent for crushed and broken stone; 17.0 percent for crushed and broken limestone; and 13.0 percent for sand and gravel (SIC 1441). See Jack G. Faucett, op. cit. Table 3.

The corresponding 1958, OBE Study estimate was 21.6 percent of output for OBE sector 9, Stone and clay mining and quarrying, which corresponds to the aggregate of our four sectors¹. Our estimates of total intermediate inputs ranged from 11.5 to 25.8 percent of output. They were below the corresponding 1958 input-output study estimate of 42.4 percent of output for OBE sector 9.

Two possible explanations for the underestimation of the intermediate inputs may be advanced. The first deals with the survey procedures, and the second with the estimation procedure.

The use of a short mail questionnaire did not provide for a complete listing of inputs, nor was it possible to contact the respondent later in order to verify his entries, since the respondent was not requested to identify himself. It seems that not all purchases of materials and supplies, and purchases of services were included. More reliable data could have been obtained by the use of long interview-type questionnaires, the experience of the Penn Jersey Transportation Study survey response notwithstanding. Moreover, the higher than expected response obtained by the RIS Survey, and the demonstrated willingness of the respondents to cooperate, as noted in Chapter 1, indicate that production data for the mining industries could be obtained by a long form.

¹National Economic Division Staff, "The Transactions Table of the 1958 Input-Output Study and Revised Direct and Indirect Total Requirements Data." Survey of Current Business, Vol. 45 (September 1965) Table 2. Purchases of materials and supplies from OBE sectors 14 to 64 and sector 82.

Since it was decided to comply with non-disclosure requirements by the use of anonymous returns, it was not possible to contact the respondent to verify his information, nor was it possible to inquire about inputs ascribed to central headquarters by branch establishments. Accordingly, no changes in the input structure were made to adjust for the accounting practices of the respondents. The errors generated by the different accounting practices can seriously affect the sampled input structure, particularly when only a few returns are used to estimate the coefficients. Moreover, the lack of regional secondary data on the structure of mining industries, comparable to that available for manufacturing, precluded the establishment of controls for the evaluation of estimates.

The Construction Industries

General Remarks

As noted in Chapter 1, the construction industry can be viewed as a process whereby the special trade contractors provide basic construction output. Part of this output which is used for new construction is delivered to the general contractors sectors which, in turn, add their own construction inputs in order to complete the product. The product of the general contractors is then delivered to final demand. The other part of the output of the special trade contractors, which is used for maintenance and repair, is transferred into a dummy sector, Maintenance and Repair, whose output, in turn, is delivered to the intermediate sectors.

This process is illustrated in Figure 1, where the requirements for materials, supplies and services flow as inputs to the special trade contractors who in turn supply their output to the general contractors for new construction and to the Maintenance and Repair

sector. Materials, supplies, and services also flow as inputs to general contractors directly. However, materials, supplies and services are not furnished directly to Maintenance and Repair sector; the latter obtain inputs only from special trade contractors.

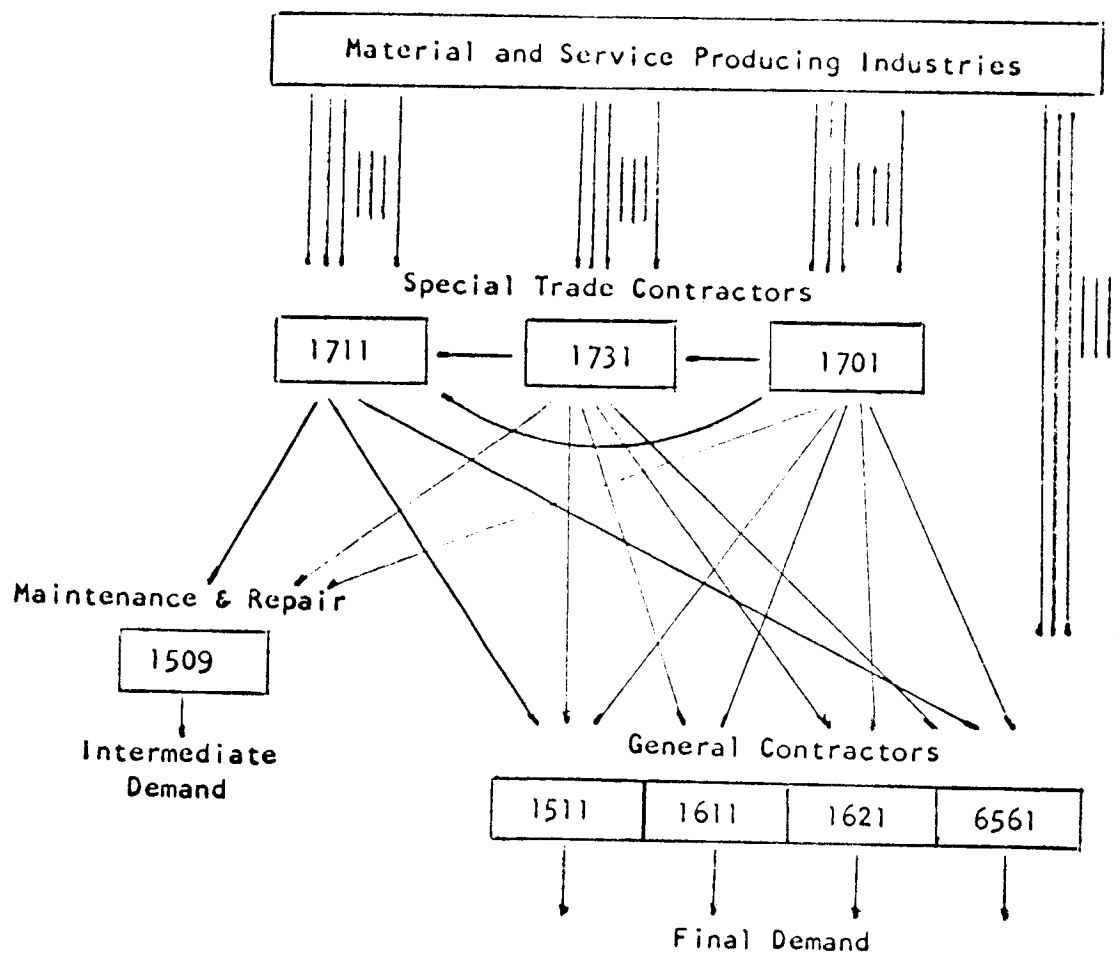
No output of the special trades was taken to be delivered directly either to intermediate or final demand. The reason for this convention was the difficulty in obtaining consistent and reliable estimates of special trades work required by their intermediate sectors, and the difficulty in identifying maintenance and repair inputs at the detailed trade breakdown for the various industries. Although some trade inputs for maintenance and repair reported on a detailed basis on some of the questionnaires of the various sectors, generally no complete detailed input specification of this sort could be obtained.¹

The above framework is consistent with the eventual disaggregation of the presently defined sectors into a finer breakdown. Special trade contractors would be identified by more homogeneous trades. The general contractors would be identified by a more detailed definition of output by type of construction, and the maintenance and repair construction disaggregated into finer and more realistic combinations of the special trade requirements specified by the consuming industries.

¹Perhaps it would have been desirable to specify three or more kinds of maintenance and repair construction sectors where in each the mix of the special trade contractors differ. In this way, it would have been possible to ask the respondent which maintenance and repair construction "mix" approximated best his inputs.

Figure 1.

FLOW CHART OF THE CONSTRUCTION INDUSTRY



This framework is in keeping with the actual construction process where construction specifications prepared by architects and engineers are organized by trade sections describing the nature of the work to be performed by each trade, and where the general (prime) contractors undertake to perform some of the trades work themselves in addition to overall coordination of the construction process. The general contractors, in turn, let subcontracts for work they do not perform. Hence, construction accounting practices are specifically geared to this method of defining sectors.

However, the value of output of the general contractors is short of the total investment costs associated with plant construction or residential construction. The value of construction work done during the year (the reported output of the general contractors) was taken to represent the value of contract awards.¹ As indicated in Chapter 1, to this measure of output, architectural and engineering fees (inputs from SIC 8911) as well as other minor expenses including real estate commissions and various brokerage fees which are paid separately by the investing owner, must be added in order to obtain the value of the final product, the value of construction put in place.² Accordingly, the input coefficients of the general contractors were first calculated at the output value of

¹Differences between these two measures were assumed negligible. For a detailed description of these measures and the conversion of contract awards data, viewed as value of work started, into value put in place by "progress patterns" as developed by the Bureau of the Census, see U.S. Bureau of the Census, Construction Reports-Series C30, Value of New Construction Put in Place: 1946-1963, Revised. (U.S. Government Printing Office, Washington, D.C. 1964), Appendix B.

²See Chapter 4 for a further discussion on the valuation of construction output, and the method used in this study.

construction work done, and were later adjusted on the basis of industry output estimates to the adjusted value put in place.

Hence, because of these different valuations of output for the construction sectors, the method for estimating the input coefficients had to be linked to output control estimates, as explained below. This approach presented a departure from that used in Manufacturing, Mining, and other divisions where input coefficients were independently estimated from their respective industry output estimates.

Measures of Output

Two measures of output were used: a) value of construction work done, and b) adjusted value put in place.¹

First, the input coefficients for the special trade contractors and general contractors were estimated on the basis of value of construction work done. Next, the revaluation of the output of the general contractors, sectors 1511, 1611, 1621 and 6560, to that of adjusted value put in place, was followed by the adjustment of the input coefficients of these sectors to the new measure of output.

The input coefficients of the dummy sector of Maintenance and Repair Construction (sector 1509) were estimated simultaneously with the estimation of construction industry output.

¹The major difference between our adjusted value put in place and the Census valuation of value put in place was in our exclusion of force account work and non-paid labor (do-it-yourself) work in estimating sector output. See Chapter 4.

Accordingly, the following measures of output were used for the construction industries defined in this study:

General Contractors--at adjusted value put in place

Sector 1511, General building Contractors--non-residential construction.

Sector 1611, Highway and Street Construction

Sector 1621, Heavy Construction

Sector 6560, Residential Contractors, developers and operative builders.

Special Trade Contractors--value of construction work done.

Sector 1711, Plumbing, Heating and Air-Conditioning Contractors

Sector 1731, Electrical Contractors

Sector 1701, Special Trade Contractors, n.e.c. (SIC 172, 174, 175, 176, 177, 178, and 179).

Maintenance and Repair Construction--value of construction work done.

Sector 1509, Maintenance and Repair Construction.

Originally, it was intended to adjust upward the output of Sector 1509 to the value of adjusted value put in place to be consistent with that of the general contractors. However, because of the different measures of final output which distinguished between new, and Maintenance and repair construction, and the difficulty in estimating the appropriate adjustment to the value of output for this sector, the refinement was considered unwarranted.¹

Owing to the unique nature of the construction industry, whose output is assembled at the purchaser's site, output was valued at purchaser's prices.

¹See Chapter 4 on the valuation of maintenance and repair construction and estimated industry output.

Definition of Sectors

As already noted, sectors were initially defined in accordance with the SIC Manual which distinguishes between general and special trade contractors. However, since operative builders (SIC 6561) were considered a part of the construction industry, two industries producing residential buildings were obtained, SIC 1511 and SIC 6561. On the other hand, the survey returns of SIC 1511 revealed that no residential construction was reported by its respondents.¹ Accordingly, industry SIC 1511 was redefined to exclude residential construction, and Sector 6560 was redefined to encompass all residential (non-farm) construction, regardless of how produced--through contract construction or own account.

Among the special trades, only the "pipe trades" were separately identified-- SIC 1711 and 1731. Their unique technological specialization, as noted in Chapter 1, and the possibility of comparing their estimated inputs to the general contractors with published regional data, determined this choice.²

Although only SIC 1711 and 1731 were separately identified, it would have been possible to identify other trades if satisfactory controls had been available. Of the trades which were aggregated into Sector 1701, the following should be considered for possible identification in future studies:

¹ See Table 1-21 and text.

² For the comparison of our estimates with those obtained from F.W. Dodge Corp. data, see Table 3-14.

SIC 1721 Painting, paperhanging and decorating

SIC 1761 Roofing and sheet metal work

Both are specialized trades whose output, which can easily be identified, constitute an important component of the Maintenance and Repair Sector.¹ In addition, SIC 147, Masonry, stonework, tile setting and plastering should, if possible, be separately identified, since this sector is an important consumer of mined inputs (SIC 14) and can provide an initial guide for the identification of kind of structure mix being built.

Measures of Input

The following input groups were obtained from the survey or derived as described below.

Cost of materials	Obtained from questionnaire
Transport cost	Estimated from listed materials costs using OBE transport margin ratios
Value of subcontracts	Obtained from questionnaire
Heat, light and power	Obtained from questionnaire
Equipment operating expenses	Obtained from questionnaire
Other operating expenses	Obtained from questionnaire
Payroll	Obtained from questionnaire
Residual	Derived from listed inputs

Value of construction work done Obtained from questionnaire

¹ Norman Frumkin, "Construction Activity in the 1958 Input-Output Study", Survey of Current Business, Vol. 45 (May 1965), pp. 13-23 and particularly Chart 10.

Cost of materials. Materials were valued at purchasers' price less transport cost. The adjustments for transport cost, to be discussed below, were applied by the same procedures developed for the manufacturing sectors.

Transport costs. Transport costs were estimated on the basis of national transport margin ratios supplied by the Office of Business Economics U.S. Department of Commerce and were applied to the material inputs listed on the questionnaires in the same manner as described in Chapter 2.

Value of Subcontracts. Value of subcontracts was in terms of purchasers' price since the product of the special trade contractors is assembled on the construction site.¹ Both total value of subcontracts and itemized values by trades were obtained in order to assure the inclusion of all items. Inputs from Sector 1711 and Sector 1731, which were separately identified in our study, were among the most frequently cited inputs together with the value of the subcontract given. In addition, painting, various masonry trades, and concrete work were generally specified at a detail and consistency permitting their separate identification for some of the general contracting sectors. However, due to the specialization of the general contractors, as noted in Chapter 1, and the differences in size of the responding firms, data on other subcontracts were incomplete. The response to this question reinforced our notion that any further disaggregation of subcontractors' categories must be accompanied by comparable disaggregation of general contractors

¹ Components of the product may be fabricated and assembled by the subcontractor at his workshop, but he finally assembles and installs his product at the construction site.

industries by type of output. In addition, the composition of output by kind of structure must be known for the general contractors so defined, in order to assure the consistency of detailed subcontractors' inputs.¹

Heat, Light and Power. Heat, light and power inputs were obtained in an aggregated form and no attempt was made to allocate them to the respective SIC categories. Accordingly, the input was measured in purchasers' prices and was specified as an input from sector 9849 as was the case with the manufacturing sectors.

Equipment Operating Expenses. No adjustment was made for the transport cost component of equipment expenses. Equipment was valued at purchasers' prices. Equipment rentals, cost of maintenance and repair, value of purchased parts, and cost of fuel and lubricants, which were covered in this group, were then allocated to their respective SIC categories. Fuels and lubricants used in the operation of equipment were separately identified and allocated as follows: 90 per cent to Sector 2911, and 10 per cent to Sector 2992. Equipment rentals were assigned to Sector 1701.

As expected, equipment operating expenses were highest for sectors 1611, Highway Construction, and 1621, Heavy Construction. The lowest input coefficients for total equipment expenses were obtained for the plumbers and electricians (sectors 1711 and 1731). See Table 3-5 for the detail.

¹Moreover, small subcontractors usually tend to work for a single operative builder or a specialized general contractor. The rest of their output consists of minor contract work and repair work. This stable relationship can however, be measured only at a high disaggregated level of classification; the difficulty of identifying the population of construction firms still remains.

TABLE 3-5

INPUT COEFFICIENTS DERIVED FROM EQUIPMENT OPERATING EXPENSES,
CONSTRUCTION SECTORS

Input Sector	Sector 1511	Sector 1611	Sector 1621	Sector 1711	Sector 1731	Sector 1701
1701	.0047	.0242	.0054	.0028	.0013	.0090
2911	.0024	.0027	.0023	.0008	.0023	.0037
2992	.0002	.0003	.0003	.0001	.0003	.0004
3531	-	.0278	.0073	* ^b	.0003	.0039
7500	.0016	.0270	.0172	.0016	.0008	.0075
Residual	-	.0008 ^a	-	-	-	.0001
Total	.0088	.0827	.0325	.0052	.0050	.0244

Note: Detail may not add to total due to rounding

^aDepreciation expenses

^bInput coefficient of .000048.

Other Operating Expenses. Inputs in this group included office supplies, which, as already noted, were not allocated to the various producing sectors. Office supplies were assigned to a dummy sector 9826, following the practice of the OBE 1958 Input-Output Study. Interest payments were assigned to sector 6020 (Commercial and stock savings banks). Insurance payments and various bonding charges were assigned to sector 6301 (non-life insurance carriers). The inputs assigned to sector 6301 were among the largest identified in the operating expenses group. Advertising expenses were assigned to sector 7310. Business and professional services were assigned to sector

7301 which include engineering and architectural services (SIC 8911) and accounting, auditing and bookkeeping services (SIC 8931).¹

Payroll. Payroll was defined to correspond with the definition used by the U.S. Census, and includes direct labor payments as well as overhead salaries and other payments (commissions, bonuses, etc.)

Review of Industry Data

The data were processed and analyzed separately in two sets: one for special trade contractors, and the other for general contractors. Moreover, each set of data was reviewed in two steps: first the reported input data classified by input groups were evaluated for consistency and completeness and missing items were estimated; and second, after inputs were allocated according to their SIC classification, the set of input coefficients was examined and compared to identify any remaining gaps or inconsistencies.

The total input coefficients for each group on each return was reviewed in the same manner as described for the mining sectors. However, in the review of the construction returns, it was possible to verify the information on detailed inputs with the respondents. Estimates in lieu of reported data were made in order to disaggregate material inputs and to complete the set of entries in the equipment and other operating expenses groups. The latter estimates were based on industry data obtained from the other returns in the sector.

¹In adjusting the output of the general contractors from the contractual value of work done to that of adjusted value put in place, the input coefficients of sector 8911 were increased to account primarily for architectural and engineering services paid by the owner. See Chapter 4.

Statistical Establishments. Statistical establishments were added to sector 1621 and sector 1701.

1. Sector 1621, Heavy Construction. Since only one complete return was obtained for this sector, a statistical establishment accounting for 10 to 30 percent of industry data was added. The inputs for this establishment were primarily from partially complete returns of the Penn Jersey Transportation Study survey, but also from secondary sources, mostly from detailed construction input coefficients of the OBE 1958 Input Output Study.¹ Still other secondary data were obtained from trade publications.²

2. Sector 1701, Special Trade Contractors, n.e.c. As noted in Chapter 1, four complete returns were obtained in the RIS Survey. Also, four additional complete returns were available, mostly reclassified questionnaire from the RIS Survey of manufacturing industries. As a result, complete returns were obtained for 5 out of the 16 4-digit SIC categories aggregated in the sector. Accordingly, statistical establishments were added to represent each of the 4-digit SIC trades for which no complete returns were available.³

¹ Norman Frumkin, op. cit. Table 2: Water Systems, Sewer Systems, and Conservation and Development. Reference was also made to the unpublished data for other construction types obtained from OBE, for military facilities and public service enterprises.

² For example, see: Turner Construction Co., "Where the Building Dollar Goes." Engineering News-Record, Oct. 8, 1953, and other issues.

³ Industries having complete returns and for which no estimates were necessary were: SIC 1741 (1 return), SIC 1761 (2 returns), SIC 1795 (1 return) and SIC 1796 (3 returns), and SIC 1752 (1 return).

The statistical establishments were based on the partially complete returns. Their detailed material inputs were estimated on the basis of:

(1) inputs in comparable manufacturing sectors (e.g. material inputs for sector 1771 were estimated on the basis of sector 3273 with additional inputs estimated for plywood and metal concrete forms.);

(2) inputs listed for specific departments or divisions of particular construction firms in other construction sectors, and

(3) miscellaneous sources such as trade publications, and estimates of knowledgeable persons in the industry.

In developing these estimates emphasis was placed on the inclusion of principal material inputs, since each statistical establishment accounted for less than 10 percent of the aggregated sector. Only a few material inputs were included in each statistical establishment.¹

The industry data, including the statistical establishments, were aggregated into the sector on the basis of estimated industry employment, in order to preserve the industry mix. The following

¹For example, for SIC 1743, (Terrazo, tile, marble and mosaic work) nine material inputs were estimated with the following accounting for more than 10 percent of total: SIC 1441 (20 percent), SIC 3253 (30 percent). Similarly, for SIC 1781, (Water well drilling) two materials inputs were estimated: SIC 3317 (80 percent) and SIC 3545 (20 percent). For SIC 1793 (Glass and glazing work) six material inputs were included with glass inputs (SIC 3211) estimated at 60 percent of total.

lists the employments weights used: ¹

SIC 172 Painting, paperhanging and decorating	.1546
SIC 174 Masonry, stonework, tile setting and plastering	.3247
SIC 175 Carpentry and wood flooring	.1342
SIC 176 Roofing and sheet metal work	.0904
SIC 177 Concrete work	.0625
SIC 178 Water well drilling	.0015
SIC 179 Misc. special trade contractors	.2321
<hr/>	
Sector 1701, Special Trade Contractors, n.e.c.	1.0000

Special Trade Contractors

The input group coefficients of the special trade contractors sectors are shown in Table 3-6.

TABLE 3-6

INPUT GROUP COEFFICIENTS OF SPECIAL TRADE CONTRACTORS

Input Components	Sector 1711	Sector 1731	Sector 1701 ^a
Cost of materials	.3935	.4034	.3046
Transport Cost	.0109	.0100	.0253
Subcontracts	.2289	.0326	.0149
Heat, Light and Power	.0011	.0021	.0030
Equipment operating expenses	.0052	.0050	.0244
Other expenses	.0264	.0437	.0588
Payroll	.2419	.4450	.4804
Residual	.0918	.0583	.0887
	1.0000	1.0000	1.0000

Note: Detail may not add to total due to rounding.

^aSector 1701 consists of SIC 172, 174, 175, 176, 177, 178 & 179.

¹See Chapter 4 for employment estimates and Appendix B-6.

Due to the heterogenous composition of Sector 1711 which includes plumbers and mechanical contractors (who engage primarily in the installation of heating, air-conditioning, and cooling systems), the input coefficients from subcontractors to Sector 1711 were the largest of the three sectors listed in Table 3-6. This fact is of particular interest since (as tabulated below) the estimated inputs from Sector 1731 to 1711 was .163859 and from Sector 1701 to 1711 was .065028, indicating the strong ties between Sectors 1711 and 1731. On the other hand, no inputs from Sector 1711 to Sector 1731 were recorded. This relationship corresponds to the actual construction process, where electrical work generally precedes the work of mechanical contractors, although plumbers and electricians may work simultaneously on the construction site. The composition of subcontractors input coefficients and the total input group coefficient for the three special trade sectors is shown in the following tabulation:

<u>Input From</u>	<u>Sector 1711</u>	<u>Sector 1731</u>	<u>Sector 1701</u>
1711	---	---	---
1731	.0650	---	---
1701	<u>.1639</u>	<u>.0326</u>	<u>.0149</u>
Total Subcontracts Group, Special Trade Contractors	.2289	.0326	.0149

The low input of subcontractors' work estimated for Sector 1701 may possibly reflect the limited data available for this heterogeneous sector. The absence of any inputs from sector 1731 to sector 1701 is due, primarily, to the incomplete data obtained for the highly aggregated sector 1701. One would expect, for instance, a few inputs

from sector 1731 to SIC 1796 (which is included in sector 1701) particularly on large projects.

The input coefficients derived from the equipment operating expenses group are presented in Table 3-5, where all equipment rentals were assigned to sector 1701, although part of these inputs should perhaps be classified with SIC 7699. Note the high value for the total input group coefficient for equipment in sector 1701, reflecting for the most part inputs associated with SIC 176, 177, 178 and particularly 179.

For the group of other operating expenses, inputs to sector 1701 were the highest, reflecting primarily the high insurance and bonding charges associated with some of the industries in this sector (e.g. SIC 176 and SIC 179).

TABLE 3-7
COEFFICIENTS FOR INPUT GROUPS:
GENERAL CONTRACTORS

Input Group	Sector 1511	Sector 1611	Sector 1621
Cost of Materials	.1377	.3186	.1936
Transport Cost	.0063	.0512	.0120
Subcontracts	.5965	.1389	.2910
Heat, Light and Power	.0022	.0032	.0008
Equipment Maintenance	.0088	.0827	.0325
Other Expenses	.0311	.0596	.0830
Payroll	.1748	.2295	.2259
Residual	.0425	.1163	.1611
	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>

Note: Detail may not add to total due to rounding.

General Contractors

For the general contractors the coefficients for input groups are presented in Table 3-7.¹

From the first and third rows of Table 3-7, note the inverse relationship between the two group inputs, materials, and subcontractors. The input coefficients in sector 6560, namely .1800 for materials and .4200 for subcontracts, are also consistent with this relationship. Moreover, due to the heterogeneous output of these sectors, particularly sectors 1511 and 6560, the variations in these coefficients are expected to be large; for some types of developers, in sector 6560, direct purchases of materials may be almost nil.²

The composition of the subcontractors' inputs can be seen in the following tabulation:

<u>Input From Sector</u>	<u>Sector 1511</u>	<u>Sector 1611</u>	<u>Sector 1621</u>
1711	.1860	---	---
1731	.1339	.0115	.0141
1701	.2765	.1274	.2769
Total subcontracts input group	.5965	.1389	.2910

As expected, road builders (sector 1611) did not use inputs from

¹ Sector 6560 was not evaluated on an input group level since it was left open awaiting the return from the largest firm in the sample at the time the construction industry was analyzed. The return was obtained at the time the construction data were submitted for card punching, and therefore the complete sampled data were tabulated in final form directly.

² The sample of sector 6560 included only operative builders (SIC 6561) although subdividers and developers (SIC 6551) are included in the sector's output.

sector 1711 and the majority of subcontracts were let to firms in sector 1731. Similarly, no inputs from sector 1711 were obtained for sector 1621, Heavy Construction. In the latter case, however, it was expected that a small input from 1711 should be included, roughly estimated at less than one percent of the value of electrical work (SIC 1731). The exclusion of inputs from sector 1711 into sector 1621 may, however, represent an omission due to the small sample available and the exclusion of this input in the estimation of the statistical establishment for this sector.

Equipment expenses, as expected, were highest for sector 1611, whereas other operating expenses were highest for sector 1621. For sector 1621, insurance and bonding costs (sector 6301) were .023 of output and engineering and architectural services and accounting services (sector 8900) were .010 of output.¹

Estimates of Input Coefficients--trade contractors

Input coefficients of sectors 1711 and 1731 were compared with industry data obtained from the respective trade associations or firms in the nation as a whole. Generally, the RIS estimates were found to conform with those of the industry as a whole.

Sector 1711. At first the data on material inputs and subcontracts were compared with the data available for mechanical contractors.²

¹ In addition, taxes were highest for sector 1621 (.0376).

² Mechanical Contractors Association of America, Annual Statistical Survey, 1963. The Association, New York, 1964, hereafter referred to in the text as MCAA. The data were based on a survey of 208 reporting member firms.

The comparison of the coefficients estimated from the RIS data with those obtained from MCAA indicate first, the general stability of the relationship between material inputs and subcontracts over the period 1959-1963 and second, that the value of the RIS estimated subcontracts was somewhat higher than for the industry as a whole. See Table 3-8.

TABLE 3-8

COMPARISON OF INPUT COEFFICIENTS OF SELECTED INPUT GROUPS, SECTOR 1711

	RIS	Mechanical Contractors (Year)				
		1959	1960	1961	1962	1963
Cost of Materials	.3935 ^a	.4214	.4157	.3960	.4094	.3663
Transport Cost	.0109					
Subcontracts	.2289 ^b	.1696	.1705	.2021	.1892	.1904
Payroll	.2419	.2531 ^c	.2670 ^c	.2612 ^c	.2250 ^c	.2694 ^c
No. of Reporting Firms	26			208		

^aTotal cost of materials plus equipments and other operating expenses is .3950 cents per dollar output.

^bValue of subcontracts only.

^cProductive field labor only.

Source: Data for mechanical contractors from Mechanical Contractors Association of America, Annual Statistical Survey, 1963. New York, The Association, 1964 and survey data.

Although the benchmark data for our study was 1959 and information was requested for that date, most of the RIS survey data for Sector 1711 reflected 1963-1965 operations while the Penn Jersey Transportation Study data for the smaller firms which were included in our tabulations

reflected 1959-1960 operations. The comparison of the RIS data for Sector 1711 with that of MCAA for 1963 indicates that our estimates resemble most closely the mechanical contractors firms in the size class of 1.50-2.49 million dollars of output. See Table 3-9.

The material input coefficients of the 1963 MCAA contractors were compared with corresponding inputs of Sector 1711. See Table 3-10. The data reveal very close correspondence between the plumbing inputs while for heating, air-conditioning and cooling, the MCAA inputs were 50 percent larger than the survey data.

Sector 1731. The input groups of the electrical trade contractors were compared with secondary data from the National Electrical Association.¹ See Table 3-11.

It is interesting to observe the three input groups coefficients, [(1) cost of materials, (2) other direct job expenses (which was assumed to include the value of subcontracts), and (3) payroll], by size of firm available from NECA, and to compare these coefficients with survey data. See Table 3-12. Since the NECA data were tabulated by size of annual production payroll (direct labor) which represented 80 per cent of total payroll, a comparable figure for the survey data was also computed. The figure obtained was \$818,200 of mean production payroll, which falls in the size class of \$500,000-1,000,000 of the National Electrical Contractors data. See Table 3-12.

The comparison of detailed coefficients in these three input groups indicates a high degree of correspondence between the survey and the NECA data.

¹National Electrical Contractors Association, Inc. A Statistical Review of the Impact of Financial Ratios, Operating Costs and Capital Investments on the Electrical Contracting Business, Washington, D.C. The Association, 1964 Convention Issue. Hereafter referred to in the text as NECA. The data in that study were based on a survey of 294 member firms.

TABLE 3-9

SECTOR 1711: 1963 MATERIALS, SUBCONTRACTS AND LABOR COEFFICIENTS BY SIZE
OF FIRM, COMPARISON BY SOURCE OF DATA

Size Class (Output in Millions of Dollars)	Input Coefficients			RIS data Sector 1711 No. of Mean Firm Returns Output (Millions of Dollars)	
	Materials (1)	Subcontracts (2)	Productive Field Wages (3)		
Data From Mechanical Contractors Association					
Over 5.00	.3264	.1676	.3446	2	3.75
2.50 - 4.99	.3756	.2093	.2355	5	2.90
1.50 - 2.49	.3813	.2260	.2273	3	1.67
1.00 - 1.49	.4125	.1838	.2266] 16	.54
.60 - .99	.4279	.1625	.2194		
.30 - .59	.4621	.0919	.2280		
Under .30	.4029	.0726	.2633		
	.3663	.1904	.2694		
All Classes	Data From RIS Survey				
	.3950	.2289	.2419	26	1.75

Source: Same as Table 3-8.

TABLE 3-10

SECTOR 1711: COMPARISON OF MATERIAL INPUT COEFFICIENTS, SURVEY
AND MECHANICAL CONTRACTORS ASSOCIATION DATA, 1963

Input	RIS Survey	Mechanical Contractors Association
3561 Pumps and compressors	.0034	
3564 Blowers and fans	.0039	
3585 Refrigerators and machinery	.1088	
3822 Temp. controls	.0082	
Heating, air conditioning and cooling except sheet metal	.1243	.1889
Sheet Metal (SIC 3444)	.0054	.0300
3261 Plumbing fixtures, china	.0037	
3431 Metal sanitary ware	.0008	
3432 Brass goods	.0388	
3433 Heating equipment	.0330	
Plumbing	.0763	.0762
3312 Steel works	.0005	
3317 Steel pipes and tubes	.0178	
Industrial piping	.0183	.0487
Other materials and apparatus	.1692	.0225
Total materials and apparatus	.3935	.3663
Transport Cost (Sector 9842)	.0109	

Source: Same as Table 3-8.

TABLE 3-11

SECTOR 1731: COMPARISON OF COEFFICIENTS FOR INPUT GROUPS, SURVEY
AND NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION DATA

Input Group	RIS Survey	Electrical Contractors (1959-1963)
Cost of Materials	.4034	.4223
Transport Cost	.0100	.0068 ^a
Subcontracts	.0326	n.a.
Heat, light and power	.0021	.0015 ^b
Equipment maintenance	.0050	n.a.
Other expenses	.0437	.0379 ^c
Payroll	.4450	.4109 ^d
Residual	.0583	.1206 ^e
	1.0000	1.0000
Number of reporting firms	9	294

^aAutomobile and truck expenses plus freight and non-direct job express charges, exclusive of non-direct job truck and warehouse salaries of .0043 of output.

^bHeat, light and water and other than amounts charged as direct job expenses.

^cOverhead cost of telephone and telegraph, interest, insurance, rent, advertising, business and professional services, taxes and office supplies.

^dDirect (productive) payroll plus overhead salaries.

^eIncludes, among others, .0751 for other direct job expenses, .0014 for small tools and shop expenses, and net profit of .0229 of output.

Source: National Electrical Contractors Association, Inc. A Statistical Review of the Impact of Financial Ratios, Operating Costs and Capital Investment on the Electrical Contracting Business, Washington, D.C. The Association, 1964 convention issue, and survey data.

TABLE 3-12

SECTOR 1731 1959-1963 COST OF MATERIALS, DIRECT JOB EXPENSES,
AND PAYROLL COEFFICIENTS BY SIZE OF FIRM, SURVEY AND NATIONAL
ELECTRICAL CONTRACTORS ASSOCIATION DATA COMPARED

Size Class, by Annual Productive Payroll	Cost of Materials	Other Direct Job Expenses	Total Payroll
National Electrical Contractors Association			
1,000,001 and over	.3866	.0927	.4419
500,001 - 1,000,000	.4204	.0781	.4262
300,001 - 500,000	.4390	.0658	.3906
200,001 - 300,000	.4486	.0805	.3920
100,001 - 200,000	.4495	.0590	.3878
25,001 - 100,000	.4363	.0522	.3871
Under 25,000	.4309	.0455	.3860
All Classes	.4223	.0751	.4109
RIS Survey	.4034	.0326 ^a	.4450

^aSubcontracts, Special trade contractors inputs.

Source: Same as Table 3-11.

Sector 1701. The coefficients of sector 1701 were not compared with any published data since the sector represents several diverse special trade contractors industries each with different input requirements. Also, comparable secondary information was lacking.

Material Inputs of Special Trade Contractors. Once the coefficients in each input group were compared with available published data, they were reallocated according to their SIC classification in order to obtain the input vector for each sector. For example, the total group coefficient of materials consumed for sector 1711 was increased from .3935 to .3957 to include material inputs of the group of equipment operating expenses.

The differences in composition of material input requirements of the three special trade contractors sectors can be seen in Table 3-13, which also records the wide range of manufactured materials used.

The importance of these sectors to the Philadelphia economy, and particularly to the manufacturing sectors, as is also evident by the number of the input items, can be seen from the magnitude of the total manufactured materials requirements, estimated at \$222,956,164.

If all materials had been purchased locally, then about two percent of the local manufacturing output, of 11,459 million dollars, would have been used by the special trade contractors for the new construction and for maintenance and repair work. Clearly, however, not all materials were locally purchased. Although the inter-regional trade coefficients for construction were not computed at this time, it is reasonable to assume that most products were purchased from local producers, particularly mined products (SIC 14) and building materials

TABLE 3-13

SPECIAL TRADE CONTRACTORS: SUMMARY BY 2-DIGIT SIC OF DIRECT
MATERIAL REQUIREMENTS FROM THE MANUFACTURING INDUSTRIES

Input 2-Digit SIC Code	Sector 1711		Sector 1731		Sector 1701	
	Agg. Input Coefficient	No. of Sectors	Agg. Input Coefficient	No. of Sectors	Agg. Input Coefficient	No. of Sectors
20	-	-	-	-	-	-
21	-	-	-	-	-	-
22	-	-	-	-	*a	1
23	-	-	-	-	-	-
24	*a	1	*a	1	.0186	6
25	-	-	-a	-	.0043	1
26	-	-	*a	1	.0056	2
27	-a	-	-	-	-	-
28	*a	1	-	-	.0468	9
29	*a	2	.0026	2	.0059	4
30	*a	1	-	-	*a	1
31	-	-	-	-	-	-
32	.0079	4	*a	2	.1380	13
33	.0372	6	.0590	3	.0423	7
34	.2105	10	.0028	3	.0107	8
35	.1162	4	*a	2	.0089	3
36	-	-	.3389	12	.0010	2
37	-	-	-	-	-	-
38	.0082	1	.0017	1	-	-
39	-	-	-	-	.0037	2
39999 ^b	.0120	1	-	-	.0084	1
Total	.3936	31	.4063	27	.2948	60

^aLess than .001

^bUnallocated material inputs

(SIC 32). According, the use of the OBE transport margin ratios tended on the one hand to overstate the transport costs associated with the use of heavy materials, particularly the inputs from major groups SIC 14 and 32, and on the other hand to understate the inputs to understate the inputs from these sectors.¹ The bias estimation of transport cost can be seen in the fact that the final stages of production of construction materials are generally market-oriented. Cox and Goodman have estimated that 9/10 of the weight of a single family house (built in Philadelphia) originates in raw materials within 100 miles or so from the house.² Moreover, in studying the marketing flows of the various building materials, Cox and Goodman estimated that about 40 percent of the total ton-miles (from the extraction site to the construction site) were used prior to first processing, about 9 percent of total ton-miles between first and last offsite processing, and over 50 percent of total ton miles were used after products passed through their last off-site processing stage.³

A further summary of the input structure of the special trade sectors is presented further in the text, in Table 3-17 together with that of general contractors.

¹Transport charges for the output included in the OBE sector 9, stone and clay mining and quarrying, were estimated at over 50 percent of producers' value.

²Reavis Cox and Charles S. Goodman, Channels and Flows in the Marketing of House-Building Materials (Philadelphia, The Wharton School, University of Pennsylvania, 1953) mimeographed p. 3-9.

³ibid. p. 2-48. Cox and Goodman estimate that "the transportation done in moving these products through their flow is equivalent to picking up a whole house and moving it approximately from New York to Washington." ibid.

Estimates of Input Structure--General Contractors

The input structures of the general contractors' sectors were compared as follows with available secondary data. However, it was not possible to compare the input structure of sector 1621 with any secondary data because of the heterogeneous output of this sector.

Subcontractors Inputs to Sectors 1511 and 6560. Inputs from Sectors 1711 and 1731, which sectors were separately identified from the other special trade contractors, were compared with F. W. Dodge Corp. data.¹ See Table 3-14. The F. W. Dodge data were tabulated for 41 contracts awarded for different types of construction in Delaware, the more urbanized part of Maryland, eastern Pennsylvania, and South New Jersey. These 41 contracts added to a total of 13.8 million dollars. As can be seen in Table 3-14, the input coefficients from Sectors 1711 and 1731 varied by type of construction. Accordingly, in comparing the F. W. Dodge data with that of sector 1511, the mix by type of construction of the sector's output must be kept in mind.²

Of particular interest are the estimated inputs from Sector 1711 and 1731 to sector 6560. Although only limited F. W. Dodge data on residential construction were available for

¹Dodge Reports, Costs and Tends, Edition C, (New York, F. W. Dodge Corporation, Summer 1960). Edition C reports on individual contracts awarded in Delaware, Maryland, Eastern Pennsylvania, South New Jersey and Virginia. In this publication only the value of subcontracts let for plumbing and air conditioning work (SIC 1711) and electrical work (SIC 1731) are reported in a consistent manner. Other subcontracts are reported only sporadically, generally for unique construction features.

²Note that 40 percent of the output of sector 1511(RIS survey data) was in manufacturing plant construction and 27 percent in commercial construction. See Table 1-21.

TABLE 3-14
 INPUT COEFFICIENTS OF GENERAL CONTRACTORS
 SECTORS 1511 and 6560

	Input from:		
	Sector 1711	Sector 1731	Total
<u>Regional Input-Output Study Data</u>			
Sector 1511	.186	.134	.320
Sector 6560	.078	.020	.098
<u>F. W. Dodge Corp. Data</u>			
All tabulated contracts (41) ^a	.197	.094	.291
Schools (9)	.209	.087	.296
Commercial buildings (9)	.193	.103	.296
Office buildings (6)	.214	.153	.367
Manufacturing plants (4) ^b	.246	.104	.350
Residences (2) ^c	.120	.076	.196

^a41 construction contracts awarded in Delaware, Maryland, Eastern Pennsylvania and So. New Jersey. Number of contracts are shown in brackets.

^bIncluding research facilities.

^cA single- and multi-family building.

Source: Dodge Reports, Costs and Tends, Edition C (New York, F. W. Dodge Corp. Summer 1960), and survey data.

comparison, these data are consistent with the general estimate employed in the construction industry, namely, that the total inputs of plumbing and electrical work, (Sectors 1711 and 1731) account for roughly 20 to 25 percent of a residential construction contract, and that electrical work accounts for about one-third of this percent. The large difference between the estimate obtained for sector 6560 and the Dodge data can perhaps be attributed to the following: a) the data for Sector 6560 included operative builders (on own account) whose input structure can be expected to differ from contract contractors and b) the RIS data includes a large integrated operation of an operative builder whose input structure may not resemble the more typical, smaller firm.¹ No adjustment in the RIS coefficients was made at this time since the total population of residential general contractors firms and operative builders and their distribution by size of firm was unknown.

Sector 1611, Coefficients of selected input groups, of the Highway and Street Construction sector were compared with published data and were found to conform generally with the information available for the industry as a whole. The comparison was made

¹Note that among the material inputs of Sector 6560 typical plumbing inputs were identified (i.e. the input from Sector 3432, plumbing, fixture fittings and trim, brass goods, of .0223). Similarly, typical electrical input were also included, in addition to inputs of household appliances (i.e. Sector 3641, electrical lamps and Sector 3642, lighting fixtures were estimated to have a combined input coefficient of .0008).

with available BLS and BPR data.¹ See Table 3-15. As can be seen from the table, the total material and supplies coefficient (of direct on-site expenses) for Sector 1611 was close to the corresponding national coefficients whereas the total coefficient for the input group of equipment was somewhat lower than the BLS data for the nation as a whole. The difference can perhaps be attributed to the fact that the SMSA firms engaged in both highway and street construction, whereas the BLS data refer to highway construction only. The sum of the equipment and the other coefficients ($.083 + .176 = .259$) was similar to the corresponding coefficients obtained from published sources.

However, the comparison of survey and BPR data with respect to selected material input coefficients indicate that perhaps the output of RIS Sector 1611 differed from that of primary highway construction covered by BPR data, and that perhaps different construction technology was used. See Table 3-16. The difference in road-building technology can be seen most clearly in the different coefficients of pre-mixed bituminous paving (Sector 2951), a product which is used more in street construction than in primary highway construction. The low figure for fabricated structural steel from survey data when compared to the corresponding figure from the national highway data, can be attributed, in part, to the fact that elevated highway construction was classified in the RIS Study in Sector 1621, while the

¹U.S. Dept. of Labor, Bureau of Labor Statistics, Labor Requirements for Federal Office Buildings, Bulletin No. 1331, 1961, p. 38 and U.S. Department of Commerce, Bureau of Public Roads, Highway Statistics: 1959, Washington, D.C., U.S. Government Printing Office, 1961, Table PT-2, p. 148.

TABLE 3-15

COMPARISON OF INPUT GROUP COEFFICIENTS, SECTOR 1611 AND PUBLISHED DATA

Inputs	RIS Sector 1611 (1)	Highways BLS Data (2)	BPR Data Federally-Aided Highways	
			Urban (3)	Total ^f (4)
Total materials & supplies	.512 ^a	.506	.533	.514
Payroll	.229	.239 ^b	.235	.234
Equipment	.083	.120 ^c	.232 ^e	.252 ^e
Other	.176	.135 ^d		
	1.000	1.000	1.000	1.000

^aTotal of materials .319, transport cost .051, subcontracts .139, and power .003.

^bOn-site wages

^cRental or depreciation charges

^dOverhead and profit

^eEquipment, miscellaneous and overhead and profit.

^fRural and urban highways

Sources: Col. 1, Survey data

Col. 2, U.S. Department of Labor, Bureau of Labor Statistics. Labor Requirements for Federal Office Buildings. Bulletin No. 1331, 1961, p.38.

Col. 3 and 4, Bureau of Public Roads, Highway Statistics: 1959, Table PT-2, p. 148. Data for federally-aided primary system highway construction.

BPR data of Table 3-16 include such construction.¹

TABLE 3-16

SELECTED MATERIAL INPUT COEFFICIENTS: COMPARISON OF SECTOR 1611
AND BUREAU OF PUBLIC ROADS DATA

Input Sector	Sector 1611	BPR Data	
		Urban	Total
1421, 1441 Aggregates and sand and gravel	.064	.052 ^b	.069 ^b
2892 Explosives	* ^a	.003	.005
2951 Pre-mixed bituminous paving	.146	.034	.043
3241 Cement	-	.041	.044
3259 Clay pipe	-	.001	.001
3272 Concrete culvert pipe	.008	.015	.014
3273 Ready mixed concrete	.062	.057	.042
3312 Reinforcing steel	.008	.048	.040
3441 Fabricated structural steel	.002	.104	.071
Total Selected Inputs	.290	.355	.329

^aLess than .001

^bPurchased aggregates

Sources: See Table 3-15.

¹Moreover, the RIS sampled firms also engaged in the repaving of existing roads. Hence their requirements for steel in bridge construction was estimated to be generally lower than if they were to engage in new construction only.

Summary of Input Structure

Once the input groups were compared with secondary data, the detailed input coefficients were derived and, when necessary, aggregated to obtain the input structure of the respective construction sectors. A summarized input structure, aggregated by economic division, is shown in Table 3-17. It illustrates the differences in the input structure of the sectors and points to the important roles of the inputs of the special trade contractors, particularly among the general contractors. The difference is further pointed up in the following tabulation:

Inputs from special trade contractors as a percent of total intermediate inputs into:

General Contractors

Sector 1511	72%
Sector 6560	63%
Sector 1621	52%
Sector 1611	26%

Special trade Contractors

Sector 1711	35%
Sector 1731	7%
Sector 1701	5%

Of interest also are the inputs from SIC 40-89, utilities, finance, insurance and real estate and various service.¹ These non-material inputs, range from .0213 for sector 1711 to .0608 for sector 1621 at one extreme they are 6 percent as large as manufactured inputs (sector 1731); at the other extreme they are

¹These inputs are covered by the input groups of equipment operating expenses and other operating expenses.

TABLE 3-17
 AGGREGATE INPUT STRUCTURE BY ECONOMIC DIVISION GROUPS,
 CONSTRUCTION SECTORS, PHILADELPHIA SMSA, 1959

2-Digit SIC Producing Industry Groups & Unassigned Input Groups	General Contractors				Special Trade Contractors		
	1511	1611	1621	6560	1711	1731	1701
10-14 Mining	.0002	.0652	.0014	.0040	.0007	-	.0159
15-17 Construction	.6012	.1631	.2966	.4340	.2317	.0339	.0239
20-39 Manufacturing	.1409	.2868	.2037	.2003	.3950	.4078	.2960
40-89 Utilities, Finance and Services	.0282	.0584	.0608	.0356	.0213	.0243	.0575
Trans. Cost (Sector 9842)	.0063	.0512	.0120	.0142	.0109	.0100	.0253
Heat, Light and Power (Sector 9849)	.0022	.0032	.0008	.0007	.0014	.0021	.0031
Total intermediate Inputs	.7790	.6279	.5752	.6888	.6610	.4781	.4217
Payroll (Sector 9888)	.1748	.2295	.2260	.0928	.2419	.4450	.4805
Residual (Sector 9899)	.0461	.1425	.1987	.2185	.0971	.0770	.0978
Output ^a	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Note: Detail may not add to total due to rounding.

^a Output valued in terms of construction work done.

almost 30 percent of manufactured inputs (sector 1621).

The adjustment in the output of the general contractors' sectors discussed in Chapter 4, required the revision of the input coefficients of these sectors. The adjustment in the input coefficients of sector 8900, in order to account for architectural and engineering fees paid by the investing owner, resulted in the increase in the total intermediate coefficient, and a proportional decrease in the other coefficients. Table 3-18 summarizes the resulting changes in the input structure of the general contractors' sectors.

Estimated Input Coefficients for the Ordnance Sector

As was noted in Chapter 1, the few ordnance industry returns were classified on a 3-digit SIC basis. The procedures whereby the data were classified, evaluated and the coefficients estimated, followed the procedures used for the manufacturing industries (SIC 20-39) except that the data were tabulated on a 3-digit SIC detail. Non-disclosure rules and the non-response from SIC 199, which in turn required the use of a statistical establishment for that category,¹ made it advisable to aggregate ordnance on a 2-digit SIC level and to obtain one ordnance sector for the region, Sector 1900.

¹The statistical establishment for SIC 199 was based on the U.S. Bureau of the Census, Census of Manufactures: 1958, Part II Industry Statistics (Washington, D.C. U.S. Government Printer, 1961) Tables 3 and 7. pp. 39E-10 and 19.

TABLE 3- 18
SUMMARIZED INPUT COEFFICIENTS OF GENERAL CONTRACTORS SECTORS
BY TYPE OF MEASURE OUTPUT

Input	Sector 1511		Sector 1611		Sector 1621		Sector 6560	
	A	B	A	B	A	B	A	B
Special Trade Contractors	.6012	.5795	.1631	.1572	.2966	.2859	.4340	.4183
Total Material Inputs	.7790	.7870	.6279	.6416	.5752	.5907	.6888	.7055
Payroll	.1748	.1685	.2295	.2211	.2260	.2178	.0928	.0894
Residual	.0461	.0445	.1425	.1373	.1987	.1915	.2185	.2051
Output	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Value of Output

A = Output measure in terms of value of construction work done.

See Table 3 - 17.

B = Output measured in terms of adjusted value put in place.

See Chapter 4.

Aggregation of 3-digit SIC data. At first the data were tabulated and coefficients estimated for each of the three 3-digit SIC categories. The 3-digit SIC coefficients were then multiplied by the estimated output of each 3-digit SIC¹ and then aggregated to yield Sector 1900 estimated coefficients. However, because of the lack of precise information on material inputs available from the industry statistics of the U.S. Census for SIC 199, representing inputs the largest coefficient was with respect to unallocated material (RIS 39999), it accounted for .2958 of output, representing 55.8 percent of total material inputs.² The second largest coefficient was with reference to the inputs of Sector 3312, Blast furnaces, steel work and rolling mills; it accounted for only .0881 of output.

¹ See Table 4-17.

² According to Census data, unallocated material inputs for subsector 199 accounted for 93 percent of total material inputs.

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Department of Regional Science
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Chapter 4

OUTPUT ESTIMATES

GENERAL

The methods used in estimating the structural coefficients for each of the sectors of manufacturing, mining and construction were described in Chapter 2 and 3. These input coefficients refer to the value of input from a particular sector, i , per dollar output of the sector under discussion, j ; and as previously noted, the structural coefficients (which include the primary input coefficients) must sum up to unity.⁽¹⁾ The arrangement of the input coefficients in matrix form yields the table of direct input requirements per dollar of gross output of the relevant sector of the Philadelphia economy for the base year, 1959. In order to obtain the interindustry current transaction matrix it is necessary to multiply the column of structural coefficients of each intermediate sector by its corresponding estimated output.

The procedures whereby estimates of output were arrived at for each sector of the manufacturing, mining and construction industries are described in this chapter. The approach to all output estimates was generally as follows:

1. Employment estimates for the base year, 1959, were obtained for each sector.

⁽¹⁾ See Chapter 2

2. Output per employee ratios were estimated for each sector in terms of the applicable measure of output.⁽¹⁾ In manufacturing, the ratio was measured in terms of value of shipments per employee.

3. Estimated output was derived by multiplying (1) the estimated employment by (2) the output per employee ratio.

Furthermore, estimates of the number of establishments, when possible, were made in order to check consistency of employment estimates and provide a guide to sampling procedures. Thus, in estimating the output of the Philadelphia sectors, two and sometimes three values were estimated, namely, employment, output, and sometimes the number of establishments. These three magnitudes for a particular industry or sector at the base year will be referred to as the industry's control estimates.

Since the table was designed for 1959 in order to take advantage of the Penn Jersey Transportation Study data for that year, it was not possible to use directly the Census information for 1958. In general, the 1958 Census data were used as benchmark data to be updated by one year, to 1959, the base year of the table.

Estimated Controls for the Manufacturing Industries

Basic Estimation Procedure of Employment

The following describes the basic procedure used in the estimation of controls for 1959 for each of the manufacturing 4-digit SIC industries identified in the region. When this procedure failed to yield reasonable estimates, alternative procedures were used, which are described in a subsequent section.

⁽¹⁾ See Table 1-7

The first step in the development of control estimates for 1959 consisted of establishing reasonably detailed 1958 benchmark estimates of the number of establishments and employees. The 1958 Census data on 3- and 4-digit SIC levels for the region were used to estimate the number of establishments and the number of employees in each 4-digit SIC in the region.⁽¹⁾ However, due to non-disclosure requirements, the information was not available for all 4-digit SIC industries represented in the SMSA. Data for the concealed classifications were estimated on the basis of the information given in the U.S. Census publication, Location of Manufacturing Plants by County, Industry and Employment Size.⁽²⁾ Reference was also made to the Pennsylvania Industrial Directory, 1962, and to the special tabulations from the Pennsylvania Department of Internal Affairs for 1958, where data were given for the five Pennsylvania counties in the region. Limited information was also obtained in the employment series of the Pennsylvania Bureau of Employment Security and the New Jersey Division of Employment Security.

Once the 1958 benchmark data were obtained it was necessary to update them by one year. Here reference was made to the Special Tabulations of the Pennsylvania Department of Internal Affairs (DIA). The DIA provides the only annual census in the region on the number of establishments, employment, wages and salaries, and value of production by

(1) U.S. Bureau of the Census, U.S. Census of Manufacturers; 1958, Vol. III Area Statistics (Washington, D.C., U.S. Government Printing Office, 1961) table 5, pp. 37-17 to 37-21.

(2) U.S. Bureau of the Census, U.S. Census of Manufacturers; 1958. Location of Manufacturing Plants by County, Industry and Employment Size. Part 2-Middle Atlantic States, Special Report MC58 (S)-3.2. (Washington, D.C., U.S. Government Printing Offices, 1961).

industry, based on a classification consistent with that of the U.S. Census. Unfortunately, no comparable information exists for the three counties in New Jersey. Hence, in the absence of specific information to the contrary, it was assumed that changes which took place during the 1958-1959 period in the Pennsylvania part of the region represented the change in the region as a whole.

Using the DIA data, the 1959/1958 ratios were calculated for both the number of establishments and the number of employees by 4-digit SIC industry. These ratios were then multiplied by the respective 1958 benchmark establishments and employment data to yield corresponding estimates for 1959. This procedure was applied to a 4-digit SIC industry when the following three criteria were met:

1. (a) the 1959/1958 ratios of employment and establishments were within the range, 0.8 to 1.2 thus suggesting that there was no drastic change which required special inquiry; and (b) the 1958 base was sufficiently large (over 20 establishments) to permit the assumption that the change was reasonable.

2. the 1958 Census benchmark estimates of establishments and employment for the five Pennsylvania counties agreed reasonably well (\pm 15 percent) with the 1958 information available from the DIA.

3. the five Pennsylvania counties contained 60 percent or more of the total SMSA employment within the industry in 1958.

The above criteria were applied to 76.7 percent of the industries in the region for which DIA data on a 4-digit SIC basis were available. Within this group of industries, criterion 1(a) was found to apply to 66.5 percent of the industries. For 23.8 percent of the industries the 1959/1958 ratio was larger than 1.2, and for 9.7 percent ratios of less

than 0.8 were observed. Hence, 51 percent (76.7×66.5) of the industries were found to conform to this requirement.

Criterion 1(b) was found to apply to 61.5 percent of the industries, not all of which were within the 51 percent group conforming to criterion 1(a). It is estimated that about 42-45 percent of the industries conformed to both parts of the first criterion.

Criterion 2 was found to apply to most of the industries that conformed to criteria 1(a) and 1(b) once a correction for under enumeration in the 1958 DIA Census was made. This correction is described in the next section, Alternate Employment Estimation Procedures.

The number of industries conforming to criterion 3 was estimated at slightly over two-thirds, with most of the industries which conformed to criterion 1 also falling into this category. Nonetheless, the requirements of both criteria 2 and 3 further reduced the number of 4-digit SIC industries which conformed to all three criteria to about 40 percent of the industries identified.⁽¹⁾

Alternate Employment Estimation Procedures

Alternative estimation methods were devised for industries not meeting the above criteria. These methods are divided into three main groups according to (1) the source of benchmark data, and (2) the ratio used. They were:

1. 1958 Census benchmark and corrected DIA ratio
2. 1959 DIA benchmark and 1958 Census ratio
3. 1958 Census and 1960 PID⁽²⁾ combined count

⁽¹⁾ See Appendix Table B - 7 for the estimates of establishments, employment and output of the manufacturing industries. Employment estimates based on the standard procedure are identified by Code A in that Table.

⁽²⁾ PID represents: Commonwealth of Pennsylvania, Department of Internal Affairs, Industrial Directory of the Commonwealth of Pennsylvania: 1962 (Harrisburg: Bureau of Statistics, 1962).

1. 1958 Census Benchmark and Corrected DIA Ratio. When the 1958 Census data were used as benchmark, the standard estimation procedure was employed together with two kinds of corrections in the 1959/1958 DIA ratio. The most common correction was for the under enumeration of the 1958 DIA industrial Census.⁽¹⁾ With the correction of the 1958 DIA base, the value of the denominator in the adjusted ratio was increased, and the ratios obtained were smaller.⁽²⁾ Table 4-1 summarizes and compares, on a 2-digit SIC level, the ratios obtained from the unadjusted DIA data and from the adjusted data for the 1958 under enumeration.

While the latter correction dealt with the denominator of the 1959/1958 ratio, the following correction was used to adjust the numerator. The adjustment in the numerator took place when the DIA establishment and employment data for 1959 did not follow the trend for the 1958-1962 period, and there was reason to assume that the deviation was due to a classification error or to a temporary shift in production of one of more establishments.⁽³⁾ In this correction, an estimate for 1959, which was arrived at by interpolation of the 1958 and 1962 data, was substituted for the given 1959 information. Interpolative methods

(1) Commonwealth of Pennsylvania, Department of Internal Affairs, Supplement to the 1959 Industrial Directory (Harrisburg: Bureau of Statistics, Nov. 1960) Part II, manufacturing companies added through coverage check, pp. 13-15.

(2) However, due to a delay in obtaining a copy of the out-of-print publication containing these corrections, ibid., this method was applied only as a correction to some of the estimates already computed on the basis of the standard procedure. Estimates obtained by this method are identified by Code Bla in Appendix Table B - 7.

(3) Commonwealth of Pennsylvania, Department of Internal Affairs, Supplement to the 1959 Industrial Directory (Harrisburg, Bureau of Statistics 1960) Part IX, manufacturing companies changing SIC code during 1959, and idem, Supplement to the 1962 Industrial Directory, Part IX manufacturing establishment changing SIC classification during 1962.

TABLE 4 - 1

COMPARISONS OF UNADJUSTED AND CORRECTED 1959/1958 DIA RATIOS OF
ESTABLISHMENTS AND EMPLOYMENT, 2-DIGIT SIC SUMMARY

2-Digit SIC Code	Unadjusted Ratios		Adjusted Ratios	
	Estab.	Employment	Estab.	Employment
20	1.0201	1.0291	0.9579	1.0010
21	1.0000	1.0076	0.9130	0.9982
22	0.9618	1.0111	0.9350	1.0004
23	0.9502	1.0688	0.9358	1.0544
24	0.9172	0.8774	0.8808	0.8296
25	1.0123	1.1666	0.9751	1.1364
26	1.0049	1.0443	0.9903	1.0396
27	1.0211	1.0607	0.8398	1.0394
28	1.0226	1.0647	0.9665	1.0547
29	1.1379	0.9634	1.0645	0.9622
30	1.1538	1.0425	1.0526	1.0274
31	0.9634	0.9508	0.9186	0.9388
32	1.1399	1.1856	0.9955	1.1254
33	1.0185	0.9500	0.9763	0.9476
34	1.1104	1.1132	1.0190	1.0758
35	1.0839	1.1028	0.9923	1.0735
36	1.0988	1.0415	1.0191	0.9966
37	1.0556	0.9992	0.9870	0.9786
38	1.1441	1.1148	0.7564	1.0924
39 ^a	1.0619	0.8175	0.9596	0.7835
Total	1.0049	1.0432	0.9488	1.0208

^aIncludes SIC 19.

Source: Commonwealth of Pennsylvania, Department of Internal Affairs, "Pennsylvania Census of Manufacturing Industries, 1958 and 1959", Special tabulations for the five counties in the Pennsylvania Part of the SMSA (Harrisburg, Bureau of Statistics, 1959 and 1960), and Commonwealth of Pennsylvania, Department of Internal Affairs, Supplement to the 1959 Industrial Directory. (Harrisburg, Bureau of Statistics, Nov. 1960) Part II.

were also used for those industries where the DIA 1959 data were withheld because of non-disclosure requirements, but where 1958 data were available.⁽¹⁾

A third approach to estimating employment on the basis of the 1958 Census benchmark data was not linked to the DIA 1959/1958 ratio. Instead, the difference in employment reported by DIA for the 1958-1959 period was added to the 1958 Census benchmark, which resulted in a crude estimate of employment for 1959. This procedure was used when the magnitudes of the Census and DIA did not conform to criteria 1b and 2 above.⁽²⁾

2. 1959 DIA Benchmark and 1958 Census Ratio

Estimating procedures based on 1959 DIA benchmark data were of two kinds. The first was used in lieu of the standard procedure for those industries for which the 1958 DIA data were not available, either because of non-disclosure requirements, or because of the absence of the industry in the 5 Pennsylvania counties (in the unadjusted DIA 1958 tabulations). Here the 1958 Census ratios of establishments and employment in the SMSA and in the 5 Pennsylvania counties within the region were used to expand the 1959 DIA benchmark value to cover the entire SMSA.⁽³⁾

The second estimating procedure based on 1959 DIA benchmark data was used when the DIA 1958 data were not available, when the 1958 Census benchmark was based on an estimate, and when the share of New Jersey

(1) Estimates obtained by this method are identified in the Appendix Table B - 7 by Code B1b.

(2) Estimates obtained by this method are identified in Appendix Table B - 7 by Code B1c.

(3) Estimates based on this method are identified in the Appendix Table B - 7 by Code B2a.

establishments in the industry was small. Here the estimated control was obtained by adding the 1959 DIA data (for the 5 Pennsylvania counties) to the 1958 derived Census figure for the New Jersey firms. In some cases data from Burlington and Camden County industrial directories were used to correct the Census data for New Jersey.⁽¹⁾ This procedure was used for some small industries not conforming to criterion 1b where the number of establishments, according to DIA in 1959, was less than ten, where the 1959 employment in the 5 Pennsylvania counties was less than 100, and where generally the number of establishments in New Jersey in 1958 was no more than two with up to about 20 employees per establishment.

The third estimating procedure based on 1959 DIA benchmark data was similar to the second (described above). In this procedure, however, the RIS 1959 estimates for New Jersey were used instead of the 1958 Census derived New Jersey figures.⁽²⁾

3. 1958 Census and 1960 PID Combined Count.

The third group of estimating procedures was based on a benchmark using both the 1958 Census and the PID data for 1960, and augmented by information from county directories for New Jersey. The method which was employed, when standard estimation procedure did not conform to the three guiding criteria, entailed the complete count of establishments and employment by size class and by county for 1958 and for 1960. For 1959 the sampled RIS data were inserted and data for the non-sampled establishments were estimated by reconciliation of the 1958 and 1960 benchmarks, mostly by interpolation of 1958 class mid-points and the 1960 actual reported information.

⁽¹⁾ Estimates based on this approach are noted by Code B2b in Appendix Table B - 7.

⁽²⁾ These estimates are noted by Code B2c in Appendix Table B - 7.

This rather lengthy procedure tended at times to overestimate the magnitude of the 1959 controls, since in several cases only gross values were used without taking into account establishments which began and those which terminated operations in the region during that period. Moreover, reporting firms, which were not listed in either source but which were reclassified into the SIC category on the basis of the return, tended to increase the estimate for 1959.

This lengthy procedure was used in almost one-third of the estimates.⁽¹⁾

A modification of the above procedure was based on partial counts, primarily of sampled establishments. It was used in a few instances where the customary sources of data were either unavailable or considered unreliable; it was generally used for small industries.⁽²⁾

Estimates of Output

After the employment estimates for all sectors were made and judged to be reasonable, the value of shipments for each sector was estimated by multiplying (1) the derived sector employment estimate by (2) the respective value of shipments per employee. The shipments per employee data used were obtained from five sources listed below in order of preference.

a. RIS Survey Ratios. In general, the shipments per employee figures obtained from the survey were used when the following criteria were met: (a) 75 percent or more of the industry was covered by the survey, or (b) the coverage of the industry's employment was 35 percent

⁽¹⁾ Estimates obtained by this procedure are noted by Code B3 in Appendix Table B - 7.

⁽²⁾ Estimates based on this procedure are noted by Code B3a in Appendix Table B - 7.

or more of total; further, either the industry establishments exhibited relatively little variation in terms of size, or the sample was considered sufficiently stratified to represent the different size classes; and, still further, New Jersey firms were included in the reported data.

b. DIA 1959 Ratios. Whenever the RIS data were considered inappropriate, the DIA ratios were used provided that the employment in the five Pennsylvania counties accounted for at least 60 percent of the industry employment in the region.

c. Disaggregated DIA Data. Whenever DIA data were also considered inappropriate, because either disclosure rules prohibited the DIA from publishing its information on a 4-digit level, or the coverage of the DIA was considered insufficient, a set of "disaggregated" DIA data was developed the disaggregation being on the basis of national Census information. At first employment estimates for 1959 were obtained by interpolation of available 4-digit SIC 1958 to 1960 DIA data in the 1959 DIA aggregate. Second, with the use of 1958 U.S. Census Industry statistics information on national production and employment by industry, 1958 shipments per employee figures were derived for the several 4-digit SIC industries in each aggregated group. Third, the Census derived shipments per employee ratios were multiplied by the 1959 estimated employment in each 4-digit SIC of the aggregate obtained above. The resulting products were then summed over all industries in the aggregated category. The ratio of the sum thus derived to the actual 1959 DIA output in the aggregate was designated the k factor--the factor to be used to adjust the census-derived value of shipments per employee figures for each 4-digit SIC industry in the aggregate. In this way adjustments of Census data were made to reflect the Philadelphia mix of 4-digit SIC categories.

d. National 1958 U.S. Census Ratios. National value of shipments per employee ratios from the Census of Manufacturers: 1958 were used in the construction of statistical establishments in those cases where no other source of data was available, i.e. for those few industries for which no survey returns were obtained and no DIA data were available.

e. Combinations of the Above Sources. In a few cases, the following procedure was followed: the shipment per employee figure obtained from the RIS survey was used to represent the fraction of the industry, covered by the survey, and the shipment per employee figure obtained from the Census or DIA was taken to represent the remainder of the industry.

The following tabulation summarizes the frequency with which the above five data sources were used to estimate shipments per employee.⁽¹⁾

	<u>Percent of Total Industries</u>
a. RIS Survey	24
b. DIA 1959 data	52
c. Disaggregated 1959 DIA data and adjusted 1958 U.S. Census Industry Statistics ratios	15
d. National 1958 U.S. Census data	2
e. Combinations of the above	<u>7</u>
Total	100

Estimated Number of Establishments

Procedures for the estimation of number of establishments generally followed the procedures for the estimation of employment and were undertaken concurrently. It should be noted, however, that the estimated number of establishments by industry proved to be useful, not only for the reasons outlined at the beginning of this chapter, but also for the

⁽¹⁾ See Appendix Table B - 7.

evaluation of the treatment of small industries. As was observed, small industries may be estimated by statistical establishments or aggregated. As noted in Chapter 2, thirty-five 4-digit SIC industries, or 9.26 percent of total number of manufacturing industries, were estimated on the basis of statistical establishments only; also of this total number the estimated number of industries in the region with three or less establishments was 20.8 percent. For these, there were no complete returns obtained at all, and 27 out of 35 statistical industries were estimated.⁽¹⁾ The remaining industries in this group were either estimated by the use of statistical establishments added to the incomplete survey data or were aggregated. The importance of this group of industries together with the group of industries having 4 to 9 establishments per industry, for which also poor coverage was obtained, can be seen in Table 4-2. This table shows that 46.3 percent of the region's industries had less than 10 establishments.

The comparison of the number of establishments reported by the 1958 U.S. Census for the SMSA with the 1959 estimates, indicates that the total number of establishments in 1959 was smaller. For most industries the difference between the two sources was rather small. The RIS estimates of number of establishments were generally less than those of the U.S. Census. The 2-digit SIC for which major differences were noted are:

SIC 20, Food products, where several of the establishments which were reported by the Census could not be identified at the time of the survey and were assumed to have ceased operations in the area.⁽²⁾

⁽¹⁾ See Table 1-12 and Chapter 1 text on the coverage of small industries, Chapter 2 on Statistical Industries and Table 2-7.

⁽²⁾ For the listing of establishments beginning and terminating operations in the 5 Pennsylvania Counties, see Commonwealth of Pennsylvania, Department of Internal Affairs. Supplement to the 1959 Industrial Directory, (Harrisburg, Bureau of Statistics, 1960), Parts I and III. For Major Group SIC 20, 10 establishments began operations in 1959 and 25 terminated operations in the area, with a net loss of 228 employees.

TABLE 4 - 2

NUMBER OF ESTABLISHMENTS IN 4-DIGIT SIC MANUFACTURING
INDUSTRIES BY 2-DIGIT SIC CLASSIFICATION

2-Digit SIC Code	Total Number of 4-Digit SIC Industries	Number of Establishments				
		1 to 3	4 to 3	10 to 19	20 to 29	30 and over
20	37	15	5	7	2	8
21	3	2	-	1	-	-
22	28	3	7	10	3	5
23	33	4	4	6	6	13
24	10	3	2	2	-	3
25	12	1	2	3	2	4
26	14	1	3	6	-	4
27	16	1	2	2	2	9
28	25	5	8	4	3	5
29	4	-	1	3	-	-
30	5	3	-	-	-	2
31	9	-	5	2	2	-
32	24	7	7	4	2	4
33	21	7	6	4	3	1
34	26	5	3	2	2	14
35	37	4	13	10	5	5
36	28	8	12	4	1	3
37	12	4	4	3	1	-
38	9	-	3	1	4	1
39	25	6	9	2	4	4
Total	378	79	96	76	42	85
Percent	100.0	20.8	25.5	20.1	11.1	22.5

SIC 23, the Apparel industry, where the number of estimated establishments was smaller than that reported by the Census. Many of the establishments in this group could not be identified and were assumed to have ceased operations. On the other hand, several establishments which were identified were not listed in the directories; and the distribution of establishments, by size class and by county, did not conform with that listed by the U.S. Census publication, Location of Manufacturing Plants by County, Industry, and Employment Size. This discrepancy indicated a change in the pattern of production common to the Apparel industry and also points to the possibility that the RIS estimates for 1959 reflect an actual decline in the number of establishments in these industries.⁽¹⁾

SIC 25, Furniture and fixtures, where the number of establishments estimated by the RIS Survey for 1959 was also smaller, by 34 establishments, than that reported by the Census. Here, again, many of the establishments could not be identified; and some of the identified establishments were reclassified on the basis of their output.⁽²⁾

SIC 27, Printing and publishing, where the RIS estimate on the number of establishments was about 3 percent greater than that reported by the 1958 Census. This seems reasonable in light of the growth of the industry and the fact that both the Census and the DIA have been known to underenumerate the establishments in this industry. ⁽³⁾

⁽¹⁾ See also Appendix B - 4 for the estimated composition of contractors and noncontractors in these industries in the SMSA.

⁽²⁾ In SIC 25, 6 establishments began operations in 1959, and 14 terminated with a net loss of employment of 231 employees. ibid.

⁽³⁾ In SIC 27, 24 establishments began operations in 1959, and 17 terminated with a net loss of 5 employees. ibid.

SIC 34, Fabricated metal products, where, again, the number of establishments estimated by RIS for 1959 was larger than that reported by the 1958 Census. This difference is accounted for mainly by the small establishments which may have escaped the enumerators of the U.S. Census. Such establishments were picked out from county industrial directories and from telephone directories and were verified by telephone spot checks. In Camden County, New Jersey, alone, the number of establishments in that industry was much larger than that reported by the Census, and accounted for almost one-half of the difference for the entire Philadelphia region.

SIC 35, Machinery, where the number of establishments estimated for 1959 was much smaller than the number reported by the 1958 Census. Reference to the various county directories and other industrial directories could not confirm the large number of establishments reported by the Census. Several of the establishments in that industry may have shifted their line of production and thus may fall in another SIC.⁽¹⁾

SIC 36, Electrical machinery, where the estimate for 1959 was larger than that reported by the 1958 Census, the difference being partly explained by the shift in production of some establishments leading to their reclassification from SIC 35 to SIC 36.⁽²⁾

SIC 39, Miscellaneous manufacturing, where the estimate for 1959 was larger than the number reported by the 1958 Census. In part, the difference reflects both the underenumeration by the Census and borderline industry classification by the DIA.

⁽¹⁾ Ibid.

⁽²⁾ Moreover, in SIC 36, 17 establishments began operations with 6 terminating, resulting in a net gain of 202 employees. ibid.

Comparison of Estimated with Selected Published Data on
Employment and Number of Establishments

To gain perspective on the validity of the estimates, a number of comparisons on a 2-digit SIC level involving the use of various published data⁽¹⁾ at that level were made. Table 4-3 compares 1959 RIS estimates and 1958 Census data on both number of establishments and employment. The ratios of RIS 1959 to Census 1958 are also presented.

To provide additional perspective other 1959/1958 ratios for employment were also calculated using data from:

(1) Annual Survey of Manufacturers: 1959 and Census of Manufacturers: 1958, and

(2) New Jersey Division of Employment Security and Pennsylvania Bureau of Employment Security for 1958 and 1959.

These three sets of ratios are summarized in Table 4-4. Certain differences between the ratios of columns 1 and 2 can be attributed, in part, to the exclusion of administrative and auxiliary employment from the Annual Survey of Manufacturers data in the 2-digit SIC major groups. When the administrative and auxiliary employment was included in the total manufacturing employment figure of the Annual Survey of Manufacturers data, the overall ratio of 1959/1958 rose from 1.035 to 1.081; the latter figure is to be compared with the RIS-Census 1959/1958 ratio of 1.088. The differences in corresponding ratios for columns (1) and (3) reflect for the most part the difference in classification practices of the Employment Security offices and the U.S. Bureau of the Census.

⁽¹⁾ U.S. Bureau of the Census, Annual Survey of Manufacturers: 1959 and 1960 (Washington, D.C.: U.S. Government Printing Office, 1962) Pennsylvania, Table 3; New Jersey Department of Employment Security and Pennsylvania Bureau of Employment Security "Special Tabulations for the Philadelphia SMSA Counties" 1958 and 1959; and U.S. Bureau of the Census and U.S. Bureau of Old-Age and Survivors Insurance, Cooperative Report, County Business Patterns, First Quarter 1959, Part 3, Middle Atlantic States, Table 3, New Jersey and Pennsylvania Counties of the Philadelphia SMSA.

TABLE 4 - 3

1959 ESTIMATES OF NUMBER OF ESTABLISHMENTS
AND EMPLOYMENT COMPARED WITH 1958
U.S. CENSUS DATA, 2-DIGIT SIC SUMMARY

	Establishments			Employment		
	1958 Census	1959 RIS	1959/ 1958	1958 Census	1959 RIS	1959/ 1958
20	804	771	0.959	50,675	52,664	1.039
21	18	20	1.111	4,353	4,408	1.013
22	502	490	0.976	33,795	37,125	1.098
23	1,060	1,008	0.951	56,369	58,310	1.034
24	208	199	0.957	3,022	3,178	1.052
25	301	267	0.987	7,509	7,159	0.953
26	248	233	0.939	19,505	21,892	1.122
27	968	997	1.030	37,406	41,104	1.099
28	426	422	0.991	29,739	33,955	1.142
29	49	51	1.041	16,473	15,802	0.959
30	141	151	1.071	11,396	12,773	1.121
31	116	108	0.931	6,468	6,352	0.982
32	323	326	1.009	12,954	14,507	1.120
33	206	203	0.985	33,626	37,032	1.101
34	900	932	1.036	45,506	43,807	0.963
35	875	790	0.903	43,261	47,927	1.108
36	292	329	1.127	46,614	56,434	1.211
37	106	108	1.019	28,251	42,113	1.491
38	157	156	0.994	12,890	13,692	1.062
39	418	436	1.043	9,746	10,369	1.064
Total	8,124	7,997	.984	515,172	560,603	1.088

Source: U.S. Dept. of Commerce, Bureau of the Census, Census of Manufacturers: 1958, Part III Area Statistics, Pennsylvania and New Jersey; and Appendix Table B - 7 for RIS estimates.

TABLE 4 - 4
COMPARISON OF 1959/1958 EMPLOYMENT RATIOS BY SOURCE OF DATA
2-DIGIT SIC, PHILADELPHIA SMSA

2-Digit	RIS 1959/ Census 1958 (1)	Annual Survey Of Manuf; 1959/ Census 1958 (2)	DES, N.J. and BES, Pa. 1959/1958 (3)
20	1.039	0.975	0.945
21	1.013	0.994	0.989
22	1.098	1.056	1.083
23	1.034	1.083	0.817
24	1.052	1.362 ^a	1.172
25	0.953	0.930	1.483
26	1.122	1.027	1.215
27	1.099	1.015	1.043
28	1.142	1.044	1.116
29	0.959	0.949	0.950
30	1.121	1.116	1.130
31	0.982	0.952	1.015
32	1.120	1.005	1.087
33	1.101	0.970	1.202
34	0.963	1.003	1.077
35	1.118	1.004	1.043
36	1.211	1.147	1.102
37	1.491	1.114	1.060
38	1.062	1.046	1.299
39	1.064	1.028	1.143
Total	1.088	1.035 ^b	1.054

^aestimated, see Table 4 - 5, footnote a.

^bAdministrative and Auxiliary employment excluded from 1959 data.

Col 1, Regional Input-Output Study 1959 estimates and U.S. Bureau of the Census, U.S. Census of Manufacturers; 1958, Vol. III Area Statistics (Washington, D.C.: U.S. Government Printing Office, 1961)

Col 2, U.S. Bureau of the Census, Annual Survey of Manufacturers; 1959, (Washington, D.C.: U.S. Government Printing Office, 1962), and Ibid.

Col 3, New Jersey Division of Employment Security and Pennsylvania Bureau of Employment Security Special tabulations for the Philadelphia, SMSA, 1958 and 1959.

Employment data by source for 1959 by 2-digit SIC major groups are presented in Table 4 - 5. As previously noted, the RIS estimates are closest to the Annual Survey of Manufacturers data, exceeding the latter's total manufacturing employment by 26,201 employees when the Administrative and Auxiliary employment was not included, however when this value is included in the manufacturing total, the difference is only 3,856 employees. This difference is largely accounted for by the fact that the RIS employment estimates were based on a more extensive coverage than the 1959 Census figures, and because certain establishments were reclassified. For example, two large firms were reclassified from the mining industries (SIC 14) to manufacturing (SIC 32), thereby increasing employment in SIC 32 by 640. The major difference between columns 1 and 2 in Table 4 - 5 is accounted for by the difference of 10,642 employees in the estimates for SIC 37. As previously noted, the reclassification of one large establishment producing missiles and space exploration equipment from SIC 19 (both DIA and Census classification) to SIC 37 (RIS classification) involved almost 5,000 employees. This reclassification accounted also for most of the difference between the RIS estimate for SIC 39 (10,369) and the Annual Survey of Manufacturers estimate for SIC 39 and SIC 19 combined (15,785). Similarly, the reclassification of an establishment placed in SIC 35 by DIA to SIC 37 increased the RIS estimate for SIC 35 by over 1400 employees.

Turning to SIC 35, where the difference is 4,938, our estimates based on detailed counts of establishments revealed additional establishments in four 4-digit SIC industries, accounting in the aggregate for about 2,800 employees. These additional establishments were not covered by Census; neither their size nor location were reported.

TABLE 4 - 5

COMPARISON OF 1959 EMPLOYMENT DATA, BY 2-DIGIT SIC,
PHILADELPHIA, SMSA

2-Digit SIC Code	RIS (1)	Annual Survey (2)	Employment Security (3)	County Business Patterns ^c (1st Quarter) (4)
20	52,664	49,406	46,537	47,233
21	4,408	4,328	4,343	4,578 ^c
22	37,125	35,647	34,674	35,782
23	58,310	61,056	42,727	56,312
24	3,178	4,178	3,295	2,989
25	7,159	6,981	9,751	7,459
26	21,892	20,032	21,697	18,449
27	41,104	37,983	37,488	36,839
28	33,955	31,059	36,522	30,866
29	15,802	15,627	21,270	15,469
30	12,773	12,719	12,138	11,390
31	6,352	6,156	6,669	6,310
32	14,507	13,019	13,701	12,304
33	37,032	32,604	36,369	33,624
34	43,807	45,662	41,729	46,766
35	47,927	43,425	45,519	41,678
36	56,434	53,458	56,897	39,677 ^c
37	42,113	31,471	25,914	20,693
38	13,692	13,485	15,318	11,993
39	10,369	15,785 ^b	9,566	17,878
Sub-total	560,693	534,108	522,344	498,289
Adm & Aux.	-	22,639	-	15,444 ^c
Total	560,603	556,747	522,344	513,733

^aResidual, total manufacturing less Administrative and Auxiliary less all reporting.

^bIncludes SIC 19.

^cEstimated adjustment for non-disclosure, taking lower limit of range of reporting establishment. No seasonal adjustment was made for first quarter employment data to represent Annual employment.

Sources: Col (1) Regional Input-Output Study estimate

Col (2) U.S. Bureau of the Census Annual Survey of Manufacturers 1959 and 1960, Pennsylvania, Table 3.

Col (3) Bureau of Employment Security (for 5 counties in Pa.) and Division of Employment Security (for 3 counties in N.J.) Special Tabulations.

Col (4) U.S. Bureau of the Census and U.S. Bureau of Old-Age and Survivors Insurance, Cooperative Report, County Business Patterns, First Quarter 1959, Part 3, Middle Atlantic States, Table 3, New Jersey and Pennsylvania Counties of the Philadelphia SMSA.

Finally, as previously noted, it should be borne in mind that the 1958 Census tended to underenumerate New Jersey firms, particularly medium and small size establishments.

Table 4 - 6 summarizes by 2-digit SIC the final control estimates for the manufacturing sectors.⁽¹⁾

TABLE 4 - 6
ESTIMATED NUMBER OF MANUFACTURING ESTABLISHMENTS, EMPLOYMENT
AND VALUE OF SHIPMENTS
BY 2-DIGIT SIC; PHILADELPHIA SMSA, 1959

2-Digit SIC Code	Establishments	Employment	Value of Shipments (\$000)
20	771	52,664	1,479,887
21	20	4,408	68,648
22	490	37,125	536,348
23	1,008	58,310	579,582
24	199	3,178	53,042
25	267	7,159	114,839
26	233	21,892	530,166
27	997	41,104	689,303
28	422	33,955	1,290,930
29	51	15,802	1,018,326
30	151	12,773	326,687
31	108	6,352	87,840
32	326	14,507	281,704
33	203	37,032	794,654
34	932	43,807	764,647
35	790	47,927	767,659
36	329	56,434	1,020,941
37	108	42,113	733,082
38	156	13,692	165,950
39	436	10,369	155,130
Total	7,997	560,603	11,459,365

⁽¹⁾ See Appendix Table B - 7 for detail.

Estimated Controls for the Mining Sectors

General

Control estimates for the mining sectors were based on Census data for 1958, augmented by DIA information. Difficulties in distinguishing the mineral industries from mining operations within manufacturing industries required estimates based on Census figures to obtain the desired universe. Accordingly, employment estimates from Census data were linked to the number of establishments recorded by the Census for each sector. These 1958 employment estimates were then updated to 1959 on the basis of DIA data. Thus it was assumed that changes that took place in the Pennsylvania part of the region were representative of change for the region as a whole. Value of shipments were derived by multiplying (1) the value of shipments per employee obtained from the 1958 Census by (2) the employment estimates for 1959.

Estimates of the Number of Establishments

Data on the number of establishments were obtained from the Census of Mineral Industries: 1958, as shown in Table 4 - 7.

TABLE 4 - 7

ESTIMATED NUMBER OF ESTABLISHMENTS IN THE MINING SECTORS, 1958

County	Sector 1411	Sector 1421	Sector 1441	Sector 1490	Total
Pennsylvania Part:					
Bucks	1	10	9	-	20
Chester	3	5	-	-	8
Delaware	5	2	-	-	7
Montgomery	4	14	-	-	18
Philadelphia	3	1	-	1	5
New Jersey Part:					
Burlington	-	-	4	1	5
Camden	-	-	8	-	8
Gloucester	-	-	5	1	6
Total, SMSA	16	32	26	3	77

Source: U.S. Bureau of the Census, Census of Mineral Industries: 1958, Vol II Area Statistics (U.S. Government Printing Office, Washington, D.C., 1961). Tables 3 and 4 for Pennsylvania and New Jersey.

Table 4 - 7 indicates that all establishments in Sectors 1411 and 1421, and one-third of the establishments in Sector 1441, were in the Pennsylvania part of the region. This distribution of establishment justified the use of the DIA data to project the change in employment for the 1958-1959 period.

According to the Pennsylvania Industrial Directories, which reported on mining establishments in 1957 and 1960, the number of establishments was as follows:⁽¹⁾

<u>Sector</u>	<u>1957</u>	<u>1960</u>
1411	6	10
1421	25	24
1441	5	7
1490	-	1
Total	<u>36</u>	<u>42</u>

However, their data were judged not to be as reliable as the Census, and accordingly were not used for estimating number of establishments. In the absence of reliable sources to update the 1958 Census data on number of establishments, the 1958 data were taken to represent the number of establishments in 1959.

Employment Estimates

Total employment figures in SIC 14, for mineral establishments only, are given in the Census for 5 out of the 8 counties, accounting for 1292 employees in 59 establishments.⁽²⁾ Assuming the mean employment size of the remaining 18 establishments in the three counties to be equal to that reported for the 59 establishments ($1292 \div 59 = 21.9$ employees/

(1) The above tabulation includes certain mining establishments which would be classified by the Census as manufacturing operations. Those establishments which RIS survey data indicated were manufacturing operations are excluded.

(2) Data on mineral establishments in Delaware County and Philadelphia County in Pennsylvania, and for Gloucester County in New Jersey, were not given.

establishment) the total employment in major group SIC 14 was estimated as 1,686 employees in 1958. On the basis of the 1959/1958 ratio, 0.9444, of employment change obtained from DIA for SIC 14, the total employment in SIC 14 in 1959 was estimated at 1,593 employees.

Sector 1421 estimate for 1958 was obtained directly from Census, since employment data were given for mineral operations in each of the 5 Pennsylvania counties. The total of employees is 1,007.

Sector 1441 estimate for 1958 was obtained from Census, where employment of mineral establishments was given for the 9 Bucks County establishments and the 8 Camden County establishments. For 17 establishments, there was a total of 369 employees. Assuming the mean employment size of the remaining 9 establishments equal to that for those reporting, the total 1958 employment was estimated at 564.

Sector 1411 estimate for 1958 was not based directly on Census information because of the absence of employment data for this sector. Instead, midpoint estimates of employment ranges were obtained from the Census and combined with data reported in the survey to yield the estimate of 92 employees.⁽¹⁾

Sector 1490 estimate for 1958 of 23 employees was obtained in a manner similar to that for Sector 1411. However, a minor adjustment in this residual category was made to assure that the employment estimates summed over all mining sectors yielded the total estimated for the major group SIC 14.

The 1958 employment estimates for each sector were then multiplied by the 1959/1958 ratio of change for major group SIC 14 (.9444) to

⁽¹⁾Census of Mineral Industries: 1958, op cit. Table 4 for Pennsylvania and New Jersey.

obtain the estimated employment in 1959. See Table 4 - 8.

TABLE 4 - 8

ESTIMATED NUMBER OF ESTABLISHMENTS, EMPLOYMENT AND
VALUE OF SHIPMENTS FOR THE MINING SECTORS, 1959,
PHILADELPHIA SMSA

Sector	Establishment	Employment	Value of Shipments
1411	16	87	1,646,562
1421	32	951	18,810,780
1441	26	533	10,047,583
1490	3	22	416,372
Total	77	1,593	30,921,297

Output Estimates

As already noted, value of shipments per employee obtained from the Census for 1958 were multiplied by the 1959 employment estimates to yield the estimated value of shipments of the mining sectors. However, since the Census reported data for mineral establishments by 4-digit SIC code were incomplete, the value of shipments per employee ratios were derived from only those establishments whose data were published by the Census.

Sector 1411. In the absence of Census data for this sector the value of shipments per employee ratio obtained for major group SIC 14 was used. This value \$16,926, was based on establishments in Bucks and Chester Counties in Pennsylvania, and Burlington and Camden Counties in New Jersey. These Census materials covered forty-one establishments and 713 employees. The estimated output for all 87 employees in the sector 1411 is \$1,646,562.

Sector 1421. A value of shipments per employee ratio of \$19,780 was calculated based on Chester and Montgomery County data, representing

19 of the 32 establishments in this sector, and accounting for 705 of the total of 1,007 employees reported by the Census. The estimated output for 951 employees in 1959 was \$18,810,780.

Sector 1441. A value of shipments per employee ratio of \$18,851 was obtained from the data given for the 9 establishments in Bucks County and the 8 in Camden County. The estimated output for the 533 employees in 1959 was \$10,047,583.

Sector 1490. The value of shipments per employee ratio obtained for major group SIC 14 (\$18,926) was used to derive the estimated output of \$416,372 for the 22 employees in this sector.

The value of shipments estimates are recorded for all sectors in Table 4 - 8.

It may be of interest to compare (1) the total estimated payroll of all mining sectors, obtained by multiplying the value of shipments of each sector by its corresponding payroll coefficient, which yields the figure of \$8,937,000 with (2) the DIA payroll figure of \$8,022,000 reported for the five Pennsylvania counties for 1959.⁽¹⁾ However, it is to be borne in mind that the DIA payroll figure includes manufacturing operations and that the payroll coefficients of the mining sectors are weak in several respects.

Estimated Output of the Construction Sectors

General

As was noted in Chapter III, three kinds of construction sectors were identified in this study: (a) General contractors (Sectors 1511,

⁽¹⁾ Commonwealth of Pennsylvania, Department of Internal Affairs, Pennsylvania's Personal Income and Population by County, Selected Years 1929-1963. Report No. Ip-1 (Harrisburg, Bureau of Statistics, May, 1965) Table 7.

1611, 1621 and 6560); (b) Special trade contractors (Sectors 1711, 1731 and 1701), and (c) Maintenance and repair construction (Sector 1509). Because the sectors, General contractors and Maintenance and repair construction, produced only a final construction product, their respective measures of output need to be distinguished from the measures of output of the special trade contractors. The output reported in the survey returns was in terms of construction work done, which, in turn approximated the value of contract awards. The reported output was considered an appropriate measure of the output of the Special trade contractors. However, the reported output for the producers of final construction product (General contractors and Maintenance and repair construction) had to be adjusted upward (as described below) to account for expenses incurred by the investing-owner which are not normally paid by the building contractors.

Output defined in the survey in terms of construction work done by the building contractors excluded (1) force account work and (2) non-paid labor work (do-it-yourself work). Such items were included in the definition of construction output in both the 1947 and 1958 U.S. inter-industry studies.⁽¹⁾ In the RIS study, force account work was not separated from the output of any industry because (1) data were not available to estimate the value of this work by sector, and (2) the RIS study adopted the procedure to keep all secondary products in the primary industry, force account work being taken to be part of the bundle of secondary products. Additionally, the value of non-paid labor work, which mostly affects the output of residential construction, was not distinguished because it could not be reasonably estimated.

⁽¹⁾ Siskind, op cit. and Frumkin, op cit.

The measure of output for the general contractors sectors was defined as adjusted value put in place. It differs from the commonly used valuation of value put in place, as used by the Bureau of the Census,⁽¹⁾ primarily because it excludes the value of force account and non-paid labor.

The output of the Maintenance and repair sector (1509) which, as noted in Chapter III, was originally intended to be in terms of adjusted value put in place, is in terms of value of construction work done; the necessary adjustments could not be consistently developed.

The estimated value of output for each of the three groups of sectors was determined largely by the availability of local data. The procedures used to adjust the data for the purpose of this study are described in the subsequent sections.

Sources of Data. Of the two sources of data available at a regional level for the estimation of construction output, namely, building permits as compiled by local municipal authorities, and contract awards as compiled by F. W. Dodge Corporation, the latter was considered more reliable. Value of construction reported by building permit issuing authorities is generally incomplete in its areal coverage, and in actual practice the building types for which permits are required are known to vary widely among municipalities. Extent of coverage by building types for which permits are required is also known to vary widely among municipalities. Moreover, value of construction reported on building permit

(1) For the definition of "value of construction put in place" and Census estimation methods see U.S. Bureau of the Census, Construction Reports --Value of New Construction Put in Place: 1946-1963, Series C30 Revised. (Washington, D.C.; U.S. Government Printing Office, 1964) Appendix A and B.

forms is generally considered to be underestimated. It is often assumed that this underreporting practice is motivated by the desire to keep property assessments down and thus reduce the local taxes on new buildings. On the other hand, not all buildings for which permits are issued are actually built. Thus, these discrepancies in coverage and valuation render the data available from this source unreliable, particularly for non-residential construction, and present difficulties in estimating the appropriate adjustments.⁽¹⁾

Contract award data as compiled by the F. W. Dodge Corporation report on contracts awarded to construction contractors through normal bidding procedures and are generally given for three major categories of new construction: (1) residential, (2) non-residential, and (3) public works and utilities. New construction as reported by this source consists of new projects, additions to existing buildings, and alterations and major repairs if included in a contract for addition to a building.

In the use of these data, adjustments for undercoverage present problems which must be overcome if contract awards are to serve as a base for estimating value of construction put in place. These are:

1. The data exclude the value of small projects, those costing less than \$10,000.
2. Construction work performed by contractors but which bypass the usual channels of contract awarding procedures are excluded.

This omission manifests itself in the private sectors, in

⁽¹⁾ Experience gained from local municipal planning studies indicate that underreporting occurs primarily on the fringe of the SMSA, in municipalities experiencing the transition from rural to suburban status. It is in these communities that a significant share of the region's new housing and commercial development takes place. It is estimated that for selected Chester County municipalities, for example, reported valuation in building permits covered less than one-half of actual value of new construction.

particular, in residential construction, and, among the non-residential sectors, primarily in the construction of some chains of retail trade outlets.

3. Force account work and non-paid labor are excluded.
4. Cost of architectural and engineering work performed on behalf of the investing client are excluded. These are generally estimated to represent most of the architectural and engineering costs associated with the construction process. They are estimated to vary generally between 3 to 7 percent of total new construction cost.⁽¹⁾

Adjustments for undercoverage of items 1, 2, and 4 were made in this study.

Estimated Output of General Contractors

Estimates of output for new construction by the general contractors, in terms of adjusted value put in place, were based on the 1959 contract award data for Philadelphia SMSA. However, the 1959 data listed only residential and non-residential categories. Contract award data for public works and utilities were not available. These magnitudes were estimated on the basis of the 1960 and 1961 contract awards data for public works and utilities. Contract award data were also corrected for undercoverage of items 1 and 2 above, based on estimated coverage ratios supplied by the Philadelphia office of F. W. Dodge Corporation.

First the 1960 and 1961 F. W. Dodge data were adjusted for undercoverage. See Table 4 - 9. Then, the ratio of public works and utility

⁽¹⁾ Siskind estimated the value of architectural and engineering fees at 5 percent of total construction output. Op. cit. p. 4-12.

TABLE 4 - 9

CONTRACT AWARDS DATA, 1960 and 1961, PHILADELPHIA SMSA
(Thousands of Dollars), UNADJUSTED AND ADJUSTED

Construction Type	Correction Factor ^a	1960		1961	
		Contract Awards	Adjusted Contract Awards	Contract Awards	Adjusted Contract Awards
Residential	1.1111	272,658	302,953	367,517	408,352
Non-Residential	1.0526	283,145	298,047	261,569	275,336
Subtotal			601,000		683,688
Public Works and Utilities	1.0101	86,144	87,014	127,106	128,390
Total		641,947	688,014	756,192	812,078

^aReciprocals of estimated coverage ratios of .90, .95 and .99 of Dodge data.

Source: F. W. Dodge Corporation, Philadelphia office.

construction to residential and non-residential construction for the 1960-1961 period was obtained from the data in Table 4 - 9. The ratio, namely 0.1677, was applied to the 1959 adjusted contract award data for residential and non-residential construction to yield the estimated value of public works and utilities for 1959. See Table 4 - 10.

TABLE 4 - 10

ESTIMATED ADJUSTED CONTRACT AWARDS FOR 1959, PHILADELPHIA SMSA
(Thousands of Dollars)

Construction Type	Reported Contract Awards	Correction Factor	Adjusted Contract Awards
Residential	330,025	1.111	366,694
Non-Residential	283,727	1.0526	298,660
Subtotal			665,354
Public Works and Utilities	n.a.		111,580 ^a
Total			776,934

$$665,354 \times .1677 = 111,580$$

Source: F. W. Dodge Corporation, Philadelphia Office.

As noted in Chapter 3, the output of Sector 1511 was taken to exclude residential construction and the output of Sector 6560 was taken to consist of all residential construction by general contractors and by builders on own account. Accordingly, the adjusted contract awards for the sectors are as follows:

<u>Sector</u>	<u>Sector Title and Contract Awards Construction Type</u>	<u>Adjusted Contract Awards (\$ 000)</u>
6560	Operative builders and general residential contractors -- Residential construction	366,694
1511	General building contractors -- Non-residential construction	298,660
1611 + 1621	Highway and heavy contractors -- Public works and utility construction	111,580
General Contractors -- All new construction		<u>776,934</u>

To allocate the value of adjusted contract awards of public works and utility construction between Highway construction (Sector 1611) and Heavy construction (Sector 1621), we first derived preliminary output estimates and percentages of total output as follows:

	<u>Sector 1611</u>	<u>Sector 1621</u>
Output per employee (RIS survey data)	\$ 21,369	28,987
Mean annual employment (Adjusted <u>County Business Patterns: 1959 data</u>) ⁽¹⁾	5,020	7,338
Estimated Output	\$107,272,380	\$212,706,606
Percent of major group SIC 16 (100%)	33.5	66.5

⁽¹⁾ See Appendix B - 6 for employment estimates based on County Business Patterns: 1959.

These percentages were then used to derive the following values of adjusted contract awards:

	Adjusted Contract Awards (\$,000)
Sector 1611, Highway Construction (33.5%)	37,380
Sector 1621, Heavy Construction (66.5%)	74,200
Public Works and Utility Construction (100%)	111,580

Adjustment in Valuation of Output These estimated outputs in terms of adjusted contract awards exclude the architectural and engineering fees paid by the owner which, when included, yield adjusted value put in place. In order to determine the appropriate adjustment for architectural and engineering fees (inputs from SIC 8911), it was necessary to increase the actual inputs from SIC 8911 to each construction sector by an amount so that the total input from SIC 8911 to the aggregate of all new construction put in place would be (1) 4 percent.

The computation of actual inputs of SIC 8911 to the four sectors of general contractors was done in two parts: First, as in column 1 of Table 4 - 11, the direct input coefficients of SIC 8911 into each of the general contractors sectors were set down. Second, the input

(1)

The estimated valuation of architectural and engineering fees paid by the owner was based on the U.S. Dept of Commerce practice of correcting national statistics of building permit valuation. This practice estimates architectural and engineering fees at 3.7 percent. See National Analysts, Inc., Philadelphia's Position in the Regional and National Economy. Technical Report #10, City of Philadelphia Community Renewal Program (Philadelphia: National Analysts, Inc., May 1964; p. 147.

coefficients of SIC 8911 to each of the special trade contractors were set down; these were then weighted by the input coefficients of the special trade contractors into any given sector of general contractors to obtain for that sector an indirect input coefficient of SIC 8911. See column 2 of Table 4 - 11. For each sector the coefficients of columns 1 and 2 of Table 4 - 11 were added to obtain the total input coefficient of SIC 8911.

On the basis of the above computation, it was estimated that \$1,895,000 in architectural and engineering fees were paid by the general contractors and their subcontractors (the Special trade contractors). The aggregated output of the general contractors in terms of adjusted contract awards was \$776,934,000. This output, when divided into \$1,895,000, yields the weighted input coefficient (of architectural and engineering services into all general contractors) of .002439. Thus, since on an industry-wide basis, architectural and engineering services are estimated at 4 percent of output of general contractors, corresponding to an input coefficient of 0.04, and since the RIS data reveal such services as constituting only 0.2439 percent of such output (corresponding to a coefficient of 0.002439), it was necessary to adjust upward the RIS input coefficient of architectural and engineering services to a figure of \$31,077,000 (corresponding to 4%) from the figure of \$1,895,000 (corresponding to 0.2439%).

The adjusted contract awards by sector were then adjusted by a factor of 1.037561 in order to account for the full amount of architectural and engineering fees paid both by the contractors and by the owner. This correction amounted to a proportional allocation of 29.132 million dollars among the four sectors of general contractors

TABLE 4 - 11

ESTIMATED INPUTS OF ARCHITECTURAL AND ENGINEERING SERVICES
(SIC 8911) OBTAINED BY SURVEY OF GENERAL CONTRACTORS

Construction Sector	Direct Input Coefficient (1)	Indirect Input Coefficient via Special Trade Con- tractors (2)	Total Input Coefficient (3)
1511	.000567	.001393	.001960
1611	.001833	.000457	.002290
1621	.010095	.000835	.010930
5650	n.a.	.001127	.001127

according to the sector's value of adjusted contract awards. See
Table 4 - 12.

TABLE 4 - 12

ESTIMATED OUTPUT OF SECTORS OF GENERAL CONTRACTORS,
1959 PHILADELPHIA SMSA
(thousands of dollars)

Sector	Adjusted Contract Awards	Adjusted Value Put In Place	Percent of Total
1511	298,660	309,878	38.44
1611	37,380	38,784	4.81
1621	74,200	76,987	9.55
6560	366,694	380,467	47.20
Total	776,934	806,116	100.00

As a result of this the upward adjustment in the input coefficient from SIC 8911 (which is aggregated into Sector 8900) and the consequent upward adjustments of outputs of general contractor sectors, all other input coefficients were recalculated.

Comparison of Estimated Output of New Construction

Comparison with Local Data. A comparison of the output of residential construction (Sector 6560) with the valuation of residential building permits in the SMSA was made. The total value of residential building permits of \$274,436,000 in 1959 was adjusted by the standard U.S. Department of Commerce factor of 17.2 percent to (1) obtain a comparable measure of output. The magnitude thus obtained was \$321,638,992, which compares with our estimated output for residential construction of \$380,467,000.

Comparison with National Data. The estimated output of the four sectors of general contractors were compared with national estimates of value of construction put in place and were generally found to be consistent in relative magnitudes. Although only the output of Sector 1611, Highway construction, was found below the more recent national estimates, the estimate was judged reasonable, particularly since 1) the national estimates included highway expenditures outside of metropolitan areas, and 2) force account construction by government was excluded from our estimate. See Table 4 - 13.

Estimated Output of Maintenance and Repair, Sector 1509.

Because of the difficulty in obtaining from local sources consistent information on maintenance and repair construction, the estimate of the output of the Maintenance and repair sector was based on

(1)

See National Analysis, cp cit. Table 10 and text.

TABLE 4 - 13

COMPARISON OF PERCENT DISTRIBUTIONS OF OUTPUT AMONG THE
FOUR SECTORS OF GENERAL CONTRACTORS

RIS Sector	Type of Construction	Phila. SMSA 1959 (1)	National 1958 (2)	National 1-0 1947 (3)	National 1-0 1958 (4)	RFF 1960 (5)
1511	Non-residential	38.4	38.5	31.0	34.4	37.6 ^a
1611	Highway	4.8	11.1	5.0	10.5	9.6
1621	Heavy	9.6	9.3	17.0	15.3	14.2 ^b
6561	Residential(non-farm)	47.2	41.1	47.0	39.8	38.6
Total New Construction		100.0	100.0	100.0	100.0	100.00

^a Obtained as a residual, total non-residential construction less Highway and Heavy (as defined below) plus Farm construction.

^b Heavy construction includes the following public non-residential construction items: Water and sewerage, Military and industrial and All other public construction. In the private non-residential construction it includes Other utilities.

Sources:

Col. 1. Regional Input-Output Study

Col. 2. U.S. Bureau of the Census, Construction Reports--Value of New Construction Put in Place: 1946-1963, Series C30, Revised. U.S. Government Printing Office, Washington, D.C. 1964.

Cols. 3 and 4. Norman Frumkin, "Construction Activity in the 1958 Input-Output Study." Survey of Current Business, Vol. 45, No. 5, May, 1965, Table 2 and p. 22.

Col. 5. Landsberg, Hans, H., Fishman, Leonard L., and Fisher, Joseph L., Resources in America's Future (Baltimore, Johns Hopkins Press, 1962) Table A4-3.

national data. Two separate estimates were made. The first was based on the 1958 input-output table for the United States, in which the output of maintenance and repair construction (OBE Sector 12) was given as 32.19 percent of new construction (OBE Sector 11).⁽¹⁾

The second estimate was based on the RFF study of the construction industry utilizing time series data, where Maintenance and repair construction in the United States for 1960 was estimated at 34.63 percent of new construction.⁽²⁾

Of these estimates the second was considered more appropriate since the region's structures are on the average older than those of the nation. Hence the output of Sector 1509 was estimated (in thousands of dollars) as:

$$\$806,116 \times 0.3463 = \$279,158$$

Once the output of Sector 1509 was obtained it was possible to estimate the input coefficients from the special trade contractors sectors. These coefficients were estimated together with the estimates of the output of the special trade contractors.

Estimated Output of Special Trade Contractors

The output of the special trade contractors, Sectors 1711, 1731 and 1701, was estimated from the interindustry data of the Philadelphia

(1)

National Economics Division Staff "The Transaction Table of the 1958 Input-Output Study and Revised Direct and Total Requirements Data", op cit. Table 1.

(2)

Hans H. Landsberg, Leonard L. Fischman, and Joseph L. Fisher, Resources in America's Future (Baltimore, Johns Hopkins Press, 1962) Table 4 - 1, p. 113.

table. Since the special trade sectors deliver their output to the general contractors and to Maintenance and repair, the relevant relationship internal to the construction industry can be described by a 3 by 3 matrix where the special trade contractors are the intermediate sectors and the general contractors and Maintenance and repair are the final demand sectors.

Accordingly, total inputs of special trade contractors to all general contractors were calculated. However, first see Table 4 - 14 for the adjusted input coefficients of the special trade contractors to the general contractors as a result of the change in the valuation of the outputs of the latter sectors. These coefficients were multiplied by the appropriate sector outputs to yield the general contractors' total dollar requirements from the special trade contractors by sector. These computed inputs are entered in Col. 5, Table 4-15. Since Sector 1711 delivered only to final construction product the estimated output of this sector consisted of (1) deliveries of Sector 1711 to new construction, estimated at \$84,115,793, and (2) deliveries of Sector 1711 to Maintenance and Repair amounting to \$29,129,299. (estimated with the use of the ratio of the output of Sector 1509 to the output of new construction namely 0.3463). Thus the total output of Sector 1711 was estimated at \$113,245,092.

The output of Sector 1731 was estimated together with the input of Sector 1731 to Sector 1509. The ratio of (a) the input of Sector 1711 to Sector 1509 to (b) total output of Sector 1711, namely 0.2572, was assumed to hold for the ratio of (1) the input of Sector 1731 to Sector 1509 to (2) total output of Sector 1731. The output of Sector 1731 was thus estimated as the sum of: (1) the input of Sector 1731 to Sector 1711, namely, \$7,363,762; (2) the input of Sector 1731 to all new construction, totalling \$48,964,839, and

(3) the input of Sector 1731 to Maintenance and Repair namely \$19,506,594 derived by multiplying the output of 1731 by the above ratio of .2572. The total output of Sector 1731 was thus estimated at \$75,839,195.

TABLE 4-14

ADJUSTED SPECIAL TRADE CONTRACTORS INPUT COEFFICIENTS,
CONSTRUCTION SECTORS

Consuming Sector	Input from Sector			
	1711	1731	1701	Total
1511	.1793	.1291	.2711	.5795
1611	-	.0111	.1463	.1572
1621	-	.0136	.2723	.2859
6560	.0751	.0197	.3236	.4183
1711	-	.0650	.1667	.2317
1731	-	-	.0339	.0339
1701	-	-	.0239	.0239
1509	.1043 ^a	.0699 ^a	.8256 ^a	1.0000

Note: Detail may not add to total due to rounding.

^aSee Table 4-15.

TABLE 4-15
THE RELATIONSHIP BETWEEN THE SECTORS OF SPECIAL TRADE CONTRACTORS
AND OTHER CONSTRUCTION SECTORS

Producing Sectors	Input Coefficients of Intermediate Construction as Consuming Sectors			Dollar Purchases by Final Construction Product Sectors Maintenance & Repair Sector		Total Output of Special Trade Contractors
	1711 (1)	1731 (2)	1701 (3)	1509 (4)	(5)	
1711	-	-	-	29,129,299	84,115,793	113,245,092
1731	.065028	-	-	19,506,594	46,964,839	75,435,195
1701	.166705	.033908	.023936	230,522,107	233,747,606	420,630,950
Total Intermediate	.231733	.033908	.023936	279,158,000	366,828,236	666,711,237
Total Output	1.000000	1.000000	1.000000	279,158,000	806,116,000	666,711,237

^aSectors 1511, 1611, 1621 and 6560.

The input of Sector 1701 to Sector 1509 was obtained as a residual from the available data:

$$\$279,158,000 - (\$29,129,299 + \$19,506,594) = \$230,522,107.$$

The output of Sector 1701 was derived from Table 4-15 as the sum of the following magnitudes:

- a) 0.166705 (input coefficient of Sector 1701 into Sector 1711) multiplied by \$113,245,092 (output of Sector 1711) = \$18,878,523;
- b) 0.033908 (input coefficient of Sector 1701 into Sector 1731) multiplied by \$75,835,195 (output of Sector 1731) = \$2,571,420;
- c) deliveries to Sector 1509 = \$230,522,107;
- d) deliveries to general contractors = \$233,747,606;
- e) 0.023936 (input coefficient of Sector 1701 into Sector 1701) multiplied by the output of Sector 1701 = \$11,911,294;
= \$497,630,950.

Input Structure of Sector 1509

As can be seen from Table 4-15 and Figure 3-1, inputs to Maintenance and repair consisted only of the special trade contractors sectors. The input coefficients of this dummy sector are shown in Table 4-14 derived from the data in Table 4-15 col. 4. Had the output of Sector 1509 been specified in terms of adjusted value put in place, then at least one additional input coefficient from SIC 8911, Architectural and engineering services, would have been necessary.

Employment Estimates for the Construction Sectors

Employment estimates were based on County Business Patterns: 1959 data adjusted to mean annual employment.⁽¹⁾ However, since the output of Sector 1511 was redefined to exclude residential construction, and Sector 6560 was redefined to include all residential construction, the employment estimates were adjusted accordingly. The adjustment was as follows: the estimated output of each of these two sectors was divided by the corresponding output per employee ratio obtained from the survey, to derive the preliminary estimates of employment. The percentages of these derived magnitudes to their combined total were then used to allocate the combined employment of Sectors 1511 and 6560 as were obtained from the adjusted County Business Patterns data. By these computations the average annual employment was estimated for Sector 1511 at 10,627 (compared with the figure of 16,741 obtained from County Business Patterns data), and for Sector 6560 at 7,269 (compared with 1,155). See Table 4-16.

The employment estimates given in Table 4-16 were not adjusted for undercoverage of County Business Patterns data and should be considered as conservative.

Estimated Output of the Ordnance Sector

As noted in Chapter 1, the ordnance industry, Sector 1900, consisted of establishments in SIC 192, 194, and 199 estimated to exist in the area in 1959. Review of the data in the Industrial directories together with the RIS survey information led to the estimates of establishments and employment recorded in Table 4-17.

⁽¹⁾ See Appendix B - 6.

TABLE 4-16
ESTIMATED EMPLOYMENT AND OUTPUT OF THE CONSTRUCTION
SECTORS, PHILADELPHIA SMSA, 1959

Sector	Industry Title	Employment	Output
1511	General Building Contractors (except residential construction)	10,627	309,878,000
1611	Highway and Street Construction	5,020	38,784,000
1621	Heavy Construction	7,338	76,987,000
6561	Operative Builders and Residential contractors (all residential construction)	7,269	380,467,000
1701	Trade Contractors, n.e.c.	27,132	497,630,950
1711	Plumbing, Heating and Air Conditioning	8,767	113,245,092
1731	Electrical Work	3,700	75,835,195
1509	Maintenance and Repair Construc- tion	(15,775 ^{a/})	279,158,000
	All Construction	69,823	1,771,985,237

^{a/} Estimated employment of special trades contractors engaged in Maintenance and Repair construction.

TABLE 4-17
ESTIMATED NUMBER OF ESTABLISHMENTS, EMPLOYMENT, AND
VALUE OF SHIPMENTS FOR THE ORDNANCE AND ACCESSORIES, SECTOR 1900
PHILADELPHIA SMSA, 1959

3-digit SIC	Establishments	Employment	Value of Shipments
192	2	355	\$4,111,965
194	3	230	4,275,240
199	1	387	8,023,671
Sector 1900	6	972	\$16,410,876

These employment estimates were considered reasonable as the Pennsylvania Industrial Directory for 1960 listed 6 establishments with 700 employees in the 5 Pennsylvania counties in major group 19.

Output estimates were obtained by multiplying (1) the estimated employment in each sub-sector (3-digit SIC industry) by (2) the value of shipments per employee obtained from the 1958 U.S. Census Industry Statistics.⁽¹⁾ See Table 4-17. The use of the national ratios instead of those obtained from the survey (which were the only locally available ratios) was determined by the nondisclosure requirements applicable to the survey information on the sub-sector basis. The national ratios used were lower than the survey ratios which had to be withheld. In the aggregate, for Sector 1900, the survey derived

¹
The value of shipments per employee ratios used were: SIC 192- \$11,583; SIC 194- \$18,855; and SIC 199 - \$20,733.

ratio (for the 4 establishments) was 1.8 times larger than the corresponding ratio of 16,883 obtained by the use of national data; but the survey derived ratio was considered unreliable in view of the poor quality of employment data obtained for some of the returns.

Regional Input-Output Study
Department of Regional Science
University of Pennsylvania
Philadelphia, Pennsylvania

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Chapter 5

AGRICULTURE, FORESTRY, and FISHERIES

INTRODUCTION

In the construction of the coefficients of the agriculture, forestry, and fisheries sectors, the decision was made to utilize only available secondary information. This decision was reached because: (1) sampling individual farms, the basic unit of production, could not easily provide operational data with respect to the product groups required by the study, (2) the economic output of this division within the study region was estimated to be only \$134,709,000.

The sectoring utilized in this division is by function and product group rather than by actual establishments existing within the region. Hence, although there were known to be 9,643 commercial farms operating within the Philadelphia SMSA during 1959, no allocation of these farms to specific sectors was attempted. The actual sectoring within agriculture was made on the basis of aggregation of the Standard Industrial Classification system, with emphasis being placed on those sectors important within the region and for

which secondary data were available.

The sector definitions are not in full conformity with those of the 1958 OBE interindustry study. The definitions and codes are given in Table 5 - 1.

Table 5 - 1

SECTOR DEFINITIONS AND CODES			
Regional Input-Output Study Sector Title	Sector Code	Standard Industrial Classification (SIC) ⁽¹⁾	Office of Business Economics (OBE) ⁽²⁾
Fruits & Vegetables	0120	0122, 0123	2(pt)
Dairy Farms	0132	0132	1(pt)
Poultry Farms	0133	0133	1(pt)
Other Agricultural Products	0190	011, 013, 014, 019, 02	1(pt) ⁽³⁾ 2(pt)
Forestry & Fishery Products	0809	074, 081, 082, 084, 086, 091	3
Agricultural, Forestry, & Fishery Services	0708	071, 0723, 0729, 085, 098	4

(1) SIC henceforth refers to: Executive Office of the President, Bureau of the Budget, Standard Industrial Classification Manual (Washington: U. S. Government Printing Office, 1957.)

(2) OBE henceforth refers to general papers, reports, etc. relating to the 1958 U. S. interindustry study conducted by the Office of Business Economics, U. S. Department of Commerce. Basic report: Morris R. Goldman, Martin L. Marimont, and Beatrice N. Vaccara, "The Interindustry Structure of the United States: A Report on the 1958 Input-Output Study" Survey of Current Business Vol. 44, No. 11 (November 1964) pp 10-29, and also Vol. 45, No. 9 (September 1965) pp 33-49.

(3) The overlap of OBE sector 1 with RIS sector 0190 involves the production of meat animals, cattle feed lot operations, and other live-stock operations, as well as part-time farms (SIC 02). Although these activities existed in the study area, they were not of significant magnitude.

AGRICULTURE (Sectors 0120, 0132, 0133, 0190)

The output of the agricultural production sectors was developed entirely on the basis of Census reported sales⁽¹⁾. The use of the Census definition thus restricts the study coverage to farms of ten acres or more having annual sales of agricultural products of at least \$50 and to those farms of less than ten acres having annual agricultural product sales of \$250 or more.

Since the dollar values are not published by the Census on an SMSA or county basis for all products, it was necessary to estimate the value of output from the quantity data available. See Table 5 - 2. The quantity data in column (1) of this table were multiplied by prices, noted in column (2), to yield the dollar value estimates in column (3). The prices used were those for the state of New Jersey as a whole. It seemed more appropriate to use the prices for New Jersey, a highly urbanized state, to represent the Philadelphia SMSA prices than other reasonably available prices, such as those for Pennsylvania or the U.S. as a whole. It is recognized that the resulting dollar values understate the sales as may be reported more realistically by the Crop Reporting Service; however the detail and uniformity of Census data over time suggests the greater usefulness of the Census of Agriculture data for a study of a highly industrialized metropolitan region.

The technical coefficients for the agricultural production sectors were developed primarily from the Agricultural Industrial Relations Study, 1955⁽²⁾ with additional information from specialized regional studies undertaken by the State-related agencies.

(1) U.S. Bureau of the Census, Census of Agriculture: 1959, Volume I, Counties, Parts 8 and 9 (New Jersey and Pennsylvania). (Washington: U. S. Government Printing Office, 1961).

(2) Robert H. Mansucci, Dollar Volume of Agriculture's Transactions with Industry, Marketing Research Report No. 375, USDA, AMS (Washington: U.S. Government Printing Office, 1959) and related working papers prepared by the Farm Income Branch. (mimeographed).

TABLE 5 - 2

AGRICULTURAL PRODUCT OUTPUT
by Sector and Sub-sector

Sector Product	Regional Output Volume (1)	Price (2)	Dollar Value of Regional Output (3)
FRUITS & VEGETABLES (RI 0120)			\$26,906,478
VEGETABLES (USDA 10)			\$15,429,946
Vegetables	-	-	12,671,830
Irish potatoes	328,667 hwt	\$ 1.95	1,635,401
Sweet potatoes	701,697 bu	1.60	1,122,715
FRUIT (USDA 11)			\$11,476,532
Strawberries	1,055,718 qts	\$.34	358,944
Raspberries	63,643 qts	.75	47,732
Blueberries	880,588 12 pts	3.00	2,641,764
Cranberries	81,491 100 bbl	9.20	749,717
Apples	1,614,697 bu	1.70	2,744,985
Peaches	1,452,171 bu	3.35	4,864,773
Pears	7,605 bu	2.35	17,872
Grapes	282,577 lbs	0.05	14,129
Plums & Prunes	2,403 bu	3.00	7,209
Cherries	326,750 lbs	0.09	29,407
DAIRY FARMS (USDA 3)(RIS 0132)			\$32,410,839
Milk & Cream			32,410,839
POULTRY FARMS (USDA 2)(RIS 0133)			\$15,701,554
Poultry & Poultry Products			15,701,554
OTHER AGRICULTURAL PRODUCTS (RIS 0190)			\$56,792,314
MEAT ANIMALS (USDA 1)			\$16,233,712
Cattle & calves	-	-	9,558,220
Hogs & pigs	-	-	6,562,782
Sheep & lambs	-	-	112,710
OTHER LIVESTOCK (USDA 4)			\$ 322,683
Horses & mules	-	-	289,082
Shorn wool	71,492 lbs	\$.47	33,601
FOOD GRAINS (USDA 5)			\$ 2,131,956
Wheat	1,174,579 bu	\$ 1.75	2,055,513
Rye	64,238 bu	1.19	76,443
FEED CROPS (USDA 6)			\$ 5,693,124
Corn	2,735,079 bu	\$ 1.27	3,473,550
Oats	191,390 bu	1.158	221,630
Barley	335,045 bu	1.02	341,746
Alfalfa	17,203 T	31.50	541,896
Clover & Timothy	10,857 T	26.00	516,282
Small grains for Hay	509 T	23.00	11,707
Other Hays	1,048 T	22.00	23,056
Soybeans*	250,342 bu	2.02	505,691
GREENHOUSE & NURSERY (USDA 17)			\$32,410,839
Nursery & Greenhouse	-	-	32,192,222
Other	-	-	218,617

NOTE: *The inclusion of soybeans within USDA sector 6 is not consistent with USDA definitions (which placed soybeans in 1-0 9, Oil Bearing Crops). It was judged however that the regional production of soybeans (\$503,000) was more closely allied to sector 6 (in this region) than to that of peanuts, flax seeds, copra, castor beans, other oil seeds and tung nuts, none of which are produced in this region.

The procedure utilized in deriving coefficients was to estimate initially for each of the USDA sectors, noted in Table 5 - 2, the total dollar requirements of inputs based upon the dollar value of output noted in the same table. These total dollar requirements of inputs, listed in columns 4 and 8 of Table 5 - 3, were obtained by multiplying the dollar value of output (column 3, Table 5 - 2) by the USDA coefficients listed in columns 3 and 7 (Table 5 - 3); these USDA coefficients were published in the USDA research report.⁽¹⁾ The dollar requirement of each input listed in columns 4 and 8 was then disaggregated to RIS sectors with the use of the disaggregate proportions⁽²⁾ listed in columns 5 and 9 to yield columns 6 and 10 respectively. Columns 6 and 10 were then added to yield the total requirements of RIS sector 0120 for each input (by RIS sector) as listed in column 11 of Table 5 - 3. These total requirements data were adjusted in the light of published data of the Census of Agriculture detailing specific expenditures.

To illustrate the basic procedure more specifically, consider the development of the inputs of finished textile products to USDA sector 10, Vegetables (shown in columns 3-6). The coefficient of inputs of finished textile products as indicated in column 3 (USDA Sector 31) as reported by the Department of Agriculture is 0.012796. This is multiplied by the total output of the Vegetable industry (\$15,429,946) as noted in Table 5-2. The product (\$197,442) shown in column 4 represents the total dollar requirements for finished textile products by the Vegetable industry within the study region.

Information from the working papers of the USDA study indicates that at producers values, 97.06% of the finished textile products

(1) Ibid.

(2) These proportions were developed from the USDA working papers.

TABLE 5 - 6
ALLOCATION SCHEDULE - SECTOR 0708

SECTOR (1)	1958 OBE COEFFICIENT (2)	RIS SECTOR (3)	DISAGGREGATE PROPORTION (4)	ADJUSTED COEFFICIENT (5)
1	.139240	0132	.200000	.027848
		0133	.100000	.013924
		0190	.000000	.097468
2	.351290	0120	.200000	.070258
		0190	.800000	.281032
4	.001050	0809	1.000000	.001050
9	.000005	1411	.53263	--
		1421	.608337	.000003
		1441	.324947	.000002
		1490	.013453	--
12	.001270	1509	1.000000	.001270
14	.004820	2041	.06277	.000030
		2042	.191932	.000925
		2045	.003944	.000019
		2046	.003822	.000019
		2062	.751541	.003622
		2093	.017181	.000083
		2099	.025243	.000122
17	.007610	2299	1.000000	.007610
21	.000050	2421	.113187	.000006
		2442	.398050	.000020
		2443	.488763	.000024
24	.001260	2643	1.000000	.001260
25	.003930	2653	.810861	.003187
		2654	.124357	.000489
		2655	.064782	.000254
26	.000020	2751	.568159	.000011
		2752	.431841	.000009
27	.000200	2871	.291565	.000058
		2872	.708435	.000142
29	.000030	2834	.847187	.000026
		2841	.113528	.000003
		2842	.039285	.000001
31	.001690	2911	.964409	.001630
		2992	.035591	.000060
32	.001170	3011	.149715	.000175
		3069	.499102	.000584
		3079	.351183	.000411
34	.000005	3151	.559597	.000003
		3199	.440403	.000002
42	.005770	3423	.231482	.001336
		3429	.299258	.001727
		3481	.336407	.001941
		3499	.132853	.000766
64	.000320	3951	.101068	.000032
		3952	.038836	.000012
		3953	.047048	.000015
		3955	.057236	.000018
		3981	.098630	.000032
		3993	.291551	.000093
		3999	.365631	.000118
65	.006990	9842	1.000000	.006990
66	.004170	4811	.805729	.003360
		4890	.194271	.000810
68	.000750	4911	.623075	.000467
		4920	.286820	.000215
		4941	.079636	.000060
		4990	.010469	.000008
70	.003330	6011	.005594	.000019
		6020	.215910	.000719
		6030	.099231	.000330
		6120	.000942	.000003
		6190	.064857	.000016
		6200	.042703	.000142
		6301	.492751	.001641
		6590	.078512	.000260
71	.010350	6510	1.000000	.010350
73	.003100	7300	1.000000	.003180
77	.000570	8061	.145024	.000083
		8090	.198585	.000113
		8211	.221554	.000126
		8220	.277826	.000159
		8290	.010975	.000006
		8486	.146036	.000083
78	.000670	9100	1.000000	.000650
79	.000070	9200	.500000	.000035
		9300	.500000	.000035
82	.000070	9826	1.000000	.000070
69				
80	.450100	9888		.180000
81		9890		.270140
VA				
1.000000				1.000000

consumed by the Vegetable industry was textile bags (SIC 2393) and the remaining 2.9303% was canvas products (SIC 2394) as shown in column 5. These proportions were used to distribute the total input value shown in the preceding column, and the resulting dollar values are shown in column 6. A similar procedure was used to obtain the data for column 10 relating to the fruit production sector. Input requirements of kindred textile products by both USDA sectors are summed in the final column.

After Census adjustments were made, the input coefficients for a given sector were obtained by dividing the input value shown in the last column for each RIS sector by the total dollar value of output of the given sector. For example, the input coefficient of textile bags (RIS 2393) for the Fruit and Vegetable Production (Sector 0120) is \$191,656 divided by \$26,906,478, that is 0.007123, as recorded in the appropriate cell of the Philadelphia Region Input-Output Table.

FORESTRY AND FISHERY PRODUCTS (Sector 0809)

This sector was defined identically with that of the 1958 OBE interindustry sector 3. The value of forestry product output is that reported as the value of forest products produced by the Census of Agriculture, 1959.⁽¹⁾ The value of output of the fishery industry is that reported in special tabulations of the Census of Commercial Fisheries, provided by the Department of the Interior, Bureau of Commercial Fisheries.⁽²⁾ Table 5-4 presents these values. See the following section for the procedure used in deriving the coefficients for this sector.

⁽¹⁾ U.S. Bureau of the Census, Census of Agriculture: 1959. ibid.

⁽²⁾ Tabulations furnished by Mr. D. L. Hoy, Program Director, Office of Statistical Services, Bureau of Commercial Fisheries, Fish and Wildlife Services, letter dated October 25, 1965.

Table 5 - 4

Value of Forestry and Fishery Products
within the Philadelphia SMSA: 1959

Forest Products	\$204,906
Fishery Products	62,700
Total	<u>\$267,606</u>

AGRICULTURAL, FORESTRY, AND FISHERY SERVICES (Sector 0708)

This sector was defined identically with that of the 1958 OBE interindustry study sector 4. The value of output of the sector could not be directly estimated owing to the lack of reported data. Hence, the value of output estimates for the agricultural, forestry, and fishery services sector were internally derived. It was assumed that there were no regional exports or imports of the produced services. The value of output is therefore equated to the sum of: (1) the dollar value of demand for the services by the other agricultural sectors; and (2) the dollar value of final demand. This procedure likewise defines the sales of the sector. Table 5 - 5 shows the demand requirements for the agricultural, forestry, and fishery services by the other sectors and final demand.

Table 5 - 5

Estimated Output - Sector 0708

Demand Sectors	Demand \$
0120	703,096
0132	277,728
0133	1,651,581
0190	532,177
0809	754
Total Intermediate	<u>\$3,165,236</u>
Final Demand	<u>1,540,262</u>
Total Demand	<u>\$4,705,498</u>

Sectors 0708 and 0809 are of relatively small magnitude. Hence, since reliable information regarding the operation of these sectors

within the Philadelphia MSA was exceedingly difficult to obtain, it was decided to use national data appropriately modified.

The procedure was as follows. Each OBE input furnished to these sectors, as recorded in the 1958 OBE interindustry table ⁽¹⁾, was examined and the RIS sectors defined as being included within these OBE sectors were noted. Certain of these RIS sectors were considered insignificant contributors to the aggregate OBE input sector. The remaining relevant RIS sectors were then estimated to contribute to the aggregate OBE sector input in proportion to their regional output. These disaggregate proportions were analysed further for consistency with known industry purchases and appropriately modified.

The above procedure was followed in the development of the agricultural, forestry, and fisheries services, sector 0708, as shown in Table 5 - 6. For example in Table 5 - 6, consider the OBE sector 26 (Printing and Publishing) which includes all of SIC industry group 27 (Printing, Publishing, and Allied Industries). Table 5 - 7 shows in column 1 the component RIS sectors of OBE sector 26. Column 2 indicates for each component sector whether or not it contributes significantly to the OBE input of printing and publishing to the RIS sector 0708. Column 3 records the regional output of only those sectors which were judged to contribute significantly. Column 4 lists the proportionate contribution of each of these sectors.

It should be noted that of the printing and publishing purchases, the most common are signs, labels, brochures, etc. which would be produced in the commercial printing job shops (RIS sectors 2751, 2752).

(1) _____, "The Transactions Table of the 1958 Input-Output Study and the Revised Direct and Total Requirements Data" Survey of Current Business. Vol. 45, No. 9, (September, 1965) p. 40.

TABLE 5 - 3
ALLOCATION SCHEDULE - SECTOR 0120

(1) USDA SECTORS	(2) RIS SECTORS	VEGETABLES (USDA 10)			FRUITS (USDA 11)				(11) TOTAL REQUIREMENTS \$	
		(3) USDA COEFFICIENT	(4) USDA SECTOR REQUIREMENT \$	(5) DISAGGREGATE PROPORTION	(6) RIS REQUIREMENTS COEFFICIENT	(7) USDA COEFFICIENT	(8) USDA SECTOR REQUIREMENT \$	(9) DISAGGREGATE PROPORTION		(10) RIS REQUIREMENT \$
7	0190	.014726	227,221	1.000000	227,221	.006564	75,332	1.000000	75,332	302,553
11	0120	.020679	319,076	1.000000	319,076					319,076
14	0190	.001555	23,994	1.000000	23,994	.000016	184	1.000000	184	24,178
18	0190	.018728	288,972	1.000000	288,972	.016632	190,878	1.000000	190,878	177,850
25	0708	.016818	259,501	1.000000	259,501	.011898	136,548	1.000000	136,548	396,049 a.
28	1421	.001319	20,352	.895333	18,222	.001038	11,913	.562829	6,705	24,927
	1474							.370956	4,419	4,419
	1475			.104667	2,130			.066215	789	2,919
29	2041	.002020	31,168	.033757	1,052	.000917	10,524	.032368	341	1,393
	2042			.928759	28,948			.930153	9,789	38,737
2044				.001316	41			.001704	18	59
2046				.036168	1,127			.035775	376	1,503
31	2393	.012796	197,442	.978697	191,656	.000423	4,855	0	0	191,656
2394				.029303	5,786			1.000000	4,855	10,641
2442		.023743	366,353	.260000	73,271	.016913	194,103	.242702	47,109	120,300
2443				.800000	293,082			.788106	141,338	434,412
2445								.029192	5,666	5,666
34	2792	.000173	2,660	1.000000	2,660	.000642	7,368	1.000000	7,368	10,037
35	2091	.053817	830,373	.001653	1,373	.054954	630,681	.000753	475	1,848
	2092			.002098	1,742			.000910	574	2,316
2093				.000585	186			.000236	161	647
2316		.5,307		.006391	5,307			.008217	5,182	10,489
2819				.310126	257,526			.178534	112,598	370,124
2533				.000321	267			.000156	98	365
2571				.521403	432,969			.269201	169,786	602,749
2573				.102237	84,897			.353502	222,948	307,845
2870				.054413	45,184			.188144	118,659	163,843
				.000773	642			.000327	266	908
36	2911	.012654	195,251	.900000	175,726	.016747	192,197	.900000	172,977	348,723 c.
2982				1.000000	19,525			1.000000	19,220	33,745 c.
37	3011	.001869	28,839	1.000000	28,839	.002130	27,888	1.000000	27,888	56,727
38	3274	.000093	1,435	.052133	75	.000058	666	.094595	63	1,33
3295				.947867	1,360			.905405	603	1,963
3429		.000823	12,699	.763441	9,695	.001060	12,165	.733869	9,171	18,366
3431				.236559	3,004			.246131	2,904	5,908
40	3522	.005598	86,377	.823660	71,145	.007440	85,385	1.000000	85,385	156,539
	3714			.176340	15,232			0	0	15,232
41	4911	.003659	56,458	.674168	38,062	.005107	58,611	.756922	44,364	82,926
	4971			.325832	18,396			.243078	14,247	32,643
42	9842	.046166	712,339	.028421	20,215	.050666	581,470	.696165	55,917	76,162
9899				.971579	69,094			.903835	525,553	1,217,647
43	4811	.001863	28,746	1.000000	28,746	.002609	29,942	1.000000	29,942	58,688
	5301	.004631	71,456	.973328	68,157	.007195	82,574	.889576	73,456	111,613
	6500			.046172	3,299			.110424	9,113	12,417
	6511	.028669	142,361	1.000000	442,361	.010709	122,902	1.000000	122,902	565,263
46	7300	.001452	22,404	1.000000	22,404	.005245	60,194	1.000000	60,194	82,598
7200		.011460	176,566	.852754	150,908	.015237	174,868	.857934	150,908	338,333
	7500			.147246	26,098			.142066	24,843	51,901
48	8086	.000303	4,675	1.000000	4,675	.001124	12,900	1.000000	12,900	17,575
1509		.007675	118,425	1.000000	118,425	.007407	85,007	1.000000	85,007	203,432
F	9899	.766702	10,904,374	1.000000	10,904,374	.756969	8,687,377	1.000000	8,687,377	19,591,810 d.
TOTAL		1.000000	\$15,429,946		\$15,429,946	1.000000	\$11,476,532		\$11,476,532	\$26,906,478

NOTES: a. adjusted to \$703,056 reflecting Census reported machine hire

b. deleted as insignificant, value put in Sector 9899

c. adjusted to \$1,380,064 in aggregate reflecting Census reported gasoline, petroleum, & petroleum products

d. adjusted by \$14,306,693 reflecting hired labor

Although products from other segments of OEE sector 26 may be consumed by the agricultural, forestry, and fishery services sector, it is estimated that such consumption is negligible for purposes of this study.

Table 5 - 7

DISAGGREGATION OF OBE SECTOR (26)
FOR RIS SECTOR 0708

RIS Sectors	Significant Inputs	Regional Output (\$000)	Disaggregate Proportion
(1)	(2)	(3)	(4)
2711	No		
2721	No		
2731	No		
2732	No		
2741	No		
2751	Yes	83,946	.568159
2752	Yes	63,805	.431841
2753	No		
2761	No		
2771	No		
2782	No		
2789	No		
2791	No		
2793	No		
2794	No		
2799	No		

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Chapter 6

TRANSPORTATION, COMMUNICATIONS, ELECTRIC, GAS, and SANITARY SERVICES

INTRODUCTION

The eight transportation sectors within the Regional Input-Output Study were defined in accordance with the Standard Industrial Classification system and reflect the major groupings of transportation activity within the Philadelphia region. The definitions and codes are shown in Table 6 - 1. All eight RIS transportation sectors are combined as interindustry sector 65 in the 1958 OBE study.

Table 6 - 1

<u>SECTOR DEFINITIONS AND CODES</u>		
Regional Input-Output Study		SIC
<u>Title</u>	<u>Sector</u>	
Railroads	4011	4011, 4013
Local & Suburban Transit	4111	4111
Taxicabs	4121	4121
Trucking, Local & Long Distance	4210	421
Public Warehousing	4220	422
Water Transportation	4400	44
Air Transportation	4500	45
Transportation Services, n.e.c.	4190	402, 4041, 4119, 413, 414, 415, 417, 4231, 46, 47.

The determination of the regional output of transportation sectors present unique problems within a regional economy. Complications arise due to the spatial nature of transportation services and the relationships of revenue to value of services rendered. It is clearly evident that regional transportation revenues are generated in the following ways:

- (1) trips originating outside the region and terminating within the region;
- (2) trips originating within the region and terminating outside the region;
- (3) trips originating and terminating outside the region but passing through the region; and,
- (4) trips wholly within the region.

Transportation services also are rendered by administrative or other non-operating activities. These services are required for effective company operation, but cannot be easily identified on a regional revenue basis since no corresponding traffic flow exists within the local area.

The sample survey coverage of the transportation sectors is shown in Table 6-2. The high coverage proportion is primarily due to the excellent response from the major public transportation companies. These companies individually constitute a high proportion of their specific sectors, which in turn account for a major proportion of total transportation activities.

Slightly differing procedures were utilized in the estimation of the value of output for each of the sectors, depending upon the specific nature of the transportation services, the detail and availability of data, and the relative regional importance of a sector.

Table 6 - 2
Sample Coverage

Regional Estimates			Sample			
Sector	Establ.	Empl.	Output (\$000)	Establ.	Empl.	Output (\$000)
4011	5	16,195	173,471	2	15,195	171,629
4111	6	8,994	95,657	3	7,522	79,975
4120	157	3,993	20,587	3	3,705	19,102
4210	116	19,194	193,845	10	3,059	30,894
4220	130	2,300	19,656	7	556	5,113
4400	76	7,372	212,260	8	2,415	29,734
4500	10	1,204	36,618	10	1,204	36,618
4190	309	3,205	23,671	*	*	*
TOTAL	817	62,457	\$775,765	43	33,656	\$373,065
Coverage				5.3%	53.9%	48.1%

*Sector 4190 is a statistical sector developed from non-sample sources; therefore, no sample data are available.

Railroads (Sector 4011)

Two major railroads, with corporate headquarters within the Philadelphia region, provided excellent data for this sector. Because of their size these two railroads dominate sector 4011. Due to the large administrative operations within the region, their total expenditures well exceed the revenue earned on a strict traffic flow basis. This presents a major difficulty in estimating output of the sector on the basis of freight and passenger revenues.

Another difficulty arises from the fact that, as in most major urban centers, rail revenues from passenger operations (commutation) do not meet expenditures. Moreover, very little revenue comes from intra-metropolitan freight movement.

For these reasons, and others, the output of this sector was estimated as the sum of (1) regional expenditures and (2) an estimated profit margin, based on the individual company's system-wide operations. Detailed examination of the operating records of the individual firms by the study research staff and substantial efforts by the respondents, made possible the development of the highly disaggregated set of inputs found in the structural matrix.

Local and Suburban Transit (Sector 4111) and
Taxicabs (Sector 4121)

These sectors were developed on the basis of intensive interviews with the few major firms in the industry. The outputs were defined as total revenues received, including taxes. Adjustments were made by the respondents to eliminate from their total revenues those revenues received for services rendered outside the region.

The sector output for the Philadelphia SMSA was obtained from multiplying (1) the sample estimates of regional revenue per employee by (2) the seasonally adjusted employment totals based on the County Business Patterns, 1959.⁽¹⁾ Although both sectors are subject to regulation by the appropriate state Public Utility Commissions, the information from these Commissions was not utilized. For the Local and Suburban Transit sector it was judged that the detail in the responses from the individual firms in the study survey was superior to that

⁽¹⁾ 1959 Philadelphia SMSA Employment by Industry (Economic Division E) County Business Patterns, RIS Memorandum, August 1965.

available from the Commissions. For the Taxicabs sector, data of the study survey were considered superior because the Commission data were not aggregated for the region or sub-regions and considerable effort would have been required to effect the necessary aggregation; therefore, the sample data with estimated sector employments were utilized.

The technical coefficients were developed from the sample survey data with the use of the standard procedure.

Trucking, Local and Long Distance (Sector 4210)

As with other transportation sectors it was difficult to define the output of trucking within a region. The trucking industry serves many areas, both locally and nationally, regardless of terminal locations. Further, the individual firms generally do not segment their operations regionally, except as required by the state regulatory agencies.

For purposes of output estimation, it was assumed that regional firms (i.e., those trucking establishments with home offices within the Philadelphia metropolitan area) earned an amount of revenue outside the region equal to the amount of revenue earned within the region by non-resident establishments.

The dollar value of output of sector 4210 was estimated from the sample by multiplying (1) the total operating revenue per employee by (2) the seasonally adjusted employment totals developed from County Business Patterns, 1959.⁽¹⁾ Although the sample reflected only the Class I Motor Carriers, no appreciable bias appeared to be introduced. The Interstate Commerce Commission reported a differential of only \$61 or 0.52% of the operating revenue earned per employee between first and

⁽¹⁾ Ibid.

second class carriers for the Middle Atlantic Region, 1959.⁽¹⁾

The sample of the ten largest Class One motor carriers was used to develop the technical coefficients. Data were obtained from the Annual Reports for 1959 filed by the motor carriers with the Interstate Commerce Commission (especially schedules 2998, 4000, 4270, 5200, and 9002). Allocation of the expenditure accounts to the interindustry sectors was made with reference to the uniform accounting regulations.⁽²⁾

Because of economies of scale and other similar considerations, the data for the larger Class I carriers are not representative of the entire trucking industry. However, the time and cost of making appropriate adjustments did not seem to be warranted considering the small changes anticipated in the technical coefficients.

Public Warehousing (Sector 4220)

The output of the public warehousing sector is defined as the total of revenues earned. Output value was estimated by multiplying the sample revenue earned per employee by the seasonally adjusted employment estimate based upon County Business Patterns.⁽³⁾ This estimate was consistent with employment figures developed from the Census⁽⁴⁾ adjusted for the 1950-59 change and for additional industrial coverage (SICs 4221, 4223, and 4226, not included in the Census data).

⁽¹⁾ Interstate Commerce Commission, TRANSPORT STATISTICS IN THE UNITED STATES for the Year ending December 31, 1959: Part 7, Motor Carriers (Washington: U.S. Government Printing Office, 1960).

⁽²⁾ Interstate Commerce Commission, UNIFORM SYSTEM OF ACCOUNTS FOR CLASS I and CLASS II COMMON AND CONTRACT CARRIERS OF PROPERTY. (Washington: U.S. Government Printing Office, 1965).

⁽³⁾ 1959 Philadelphia SMSA Employment by Industry (Economic Division E) County Business Patterns, RIS Memorandum, August, 1965.

⁽⁴⁾ U.S. Bureau of the Census, U.S. CENSUS OF BUSINESS: 1958 Wholesale Trade (BC58-WS7) Public Warehousing (Washington: U. S. Government Printing Office, 1961).

The technical coefficients were based entirely upon information obtained from interviews conducted by the Penn Jersey Transportation Study.

Water Transportation (Sector 4400)

A significant portion of the Philadelphia economy is linked to its waterborne transportation facilities. This basic transportation industry is historically complex and considerable difficulty is encountered in obtaining reliable primary data. Its business practices are unique and only limited cooperation could be secured. The sector was developed from data provided by (1) knowledgeable personnel in the area, especially those of the port development agencies; (2) past studies of port development and financing; and (3) detailed interviews with a few cooperative firms.

The output of the sector is fundamentally related to the level of shipping activity in the port. The basic data were obtained from the Corps of Engineers reports.⁽¹⁾ Gross tonnage values were estimated for bulk and general cargo categories. The values representing the breakdown of general and bulk cargo shown in Table 6-3 may not be consistent with

Table 6 - 3
Philadelphia Region Port Activity
Tonnage Handled - 1959

	General Cargo (Tons)	Bulk Cargo (Tons)	Total Tonnage (Tons)
FOREIGN			
Import	1,466,743	39,276,108	40,742,851
Export	585,469	1,843,862	2,429,331
TOTAL FOREIGN	2,052,212	41,119,970	43,172,182
COASTWISE	2,844,504	25,600,534	28,445,038
INTERNAL	2,005,368	18,048,315	20,053,683
INTRA PORT	114,545	1,030,903	1,145,448
LOCAL	223,868	2,014,811	2,238,679
<u>TOTAL</u>	<u>7,240,497</u>	<u>87,814,533</u>	<u>95,055,030</u>

Estimates based on: U.S. Army Corps of Engineers, loc. cit.

(1) Department of the Army, Corps of Engineers, Waterborne Commerce of the United States, calendar year 1959, Part I, "Waterways and Harbors, Atlantic Coast."

those of other studies using differing definitions; however, it is judged that these are valid for the input-output study purposes.

Port activity was divided functionally into six major segments. Based on a revised study by the Delaware River Port Authority⁽¹⁾ with appropriate adjustments to reflect technological and price changes, an allocation of cost per ton per segment was developed as shown in Table 6-4.

Table 6 - 4
Estimated Functional Expenditures Per Ton Of Cargo Handled.

Group	General Cargo	Bulk Cargo
Pilotage	\$0.13	\$0.08
Towing	0.27	0.16
Terminals	0.84	0.90
Bunkerage	0.17	0.17
Stevedoring	6.00	-
Dockage & Others	0.56	0.45
Total	\$7.97	\$1.76

From interview information, the expenditures for each of the functional groups were broken down in terms of RIS interindustry sectors. A significant portion of the expenditures of these groups are purchases from others within the waterborne transportation sector. The resulting large intra-industry trade flow is 0.315191.

Air Transportation (Sector 4500)

The air transportation sector was developed primarily from the records of the ten certificated route air carriers operating in the Philadelphia region during 1959. Of the four certificated lines omitted by the study, one did not engage in any appreciable amount of

(1) Delaware River Port Authority, "The Value of a Ton of Cargo to the Area's Economy," September 1953, revised September 1955. Also see: "The Economic Impact of the Delaware River Ports," Alderson Associates, Inc. January 1959; "Port Development Requirements" Arthur D. Little, Inc. April 1965; and "The General Cargo Situation in the Port of Philadelphia, 1964." City of Philadelphia, April 1965, with economic report by Langford, Evans, and Karaska.

domestic passenger air service within the region and the others were air freight carriers having little revenue operations within the study region.

The operating data were obtained from the "Form 41 Reports" filed by the carriers with the Civil Aeronautics Board. Reconciliation of the accounts and sub-accounts with the interindustry sectors was made with reference to the uniform system of accounts.⁽¹⁾

Regional allocation of revenues was based upon the data provided in schedule T-4, "On-Line Airport Activity Data." On the basis of fourth quarter information, the proportion of Philadelphia activity to total domestic activity was calculated for each of the following categories: number of revenue passengers, tons of U.S. mail and tons of expressage and freight. Each proportion was then multiplied by the appropriate revenue category total. This allocation thus implicitly assumes that: (1) the distribution of revenue air miles for Philadelphia activity is not significantly different from that of the system as a whole; (2) the charter, other revenue services, and incidental non-transport revenues received were not significant in Philadelphia; and (3) the expenditures for the system as a whole are reasonably representative of the actual regional expenditures for the air transportation activities.

Transportation Services, not elsewhere classified (Sector 4190)

The Transportation Services, n.e.c. sector represents the residual categories not included in the above sectors. In general, each of these industries were relatively small and primary data were difficult to obtain.

⁽¹⁾Civil Aeronautics Board, Uniform System of Accounts and Reports for Certificated Air Carriers, as amended through June 1, 1965. (Washington: U.S. Government Printing Office, 1965).

The sector was considered in terms of three sub-groups each having relatively similar characteristics: (1) SICs 4119, 413, 414, and 415 which are primarily bus operations and were responsible for approximately 30% of the total sector employment; (2) SICs 404, 423, 471, and 472 which have heavy truck operations and related expenditures; and (3) SICs 402, 417, 473, 474, 478, 46 and 47 which have office operations as their major type of expenditures. The third sub-group was responsible for approximately 60% of the estimated sector employment.

The individual group input structures were estimated on the bases of similar operations within other industries (as noted in the above paragraph) and national trade association information. The output was estimated by multiplying estimated output per employee ratios by the appropriate levels of employment.⁽¹⁾

COMMUNICATIONS

INTRODUCTION

Four communications sectors were defined based upon the Standard Industrial Classification system. The sector definitions and codes are indicated in table 6-5.

Table 6 - 5

Sector Definitions and Codes

Regional Input-Output Study		SIC	OBE
Title	Sector		
Telephone Communications	4811	4811	66 (pt)
Radio Broadcasting	4832	4832	67 (pt)
Television Broadcasting	4833	4833	67 (pt)
Communication Services, n.e.c.	4890	4821 4899	66 (pt)

Within the study region these industries are characterized by a few major firms having very large service areas and a limited number of

⁽¹⁾ 1959 Philadelphia SIMSA Employment by Industry (Economic Division E) County Business Patterns, RIS Memorandum, dated August 1965.

small firms serving extremely small areas. In general, the procedure was to obtain detailed survey information from the major establishments serving the region. Limited information was obtained for the smaller firms only when it was judged that they represented in aggregate a significant proportion of total sector output. Table 6-6 indicates the study survey coverage.

Table 6 - 6
Survey Coverage

Sector	Regional Estimates			Survey Coverage		
	Estab.	Empl.	Output (\$000)	Estab.	Empl.	Output (\$000)
4811	7	17,224	272,060	2	16,957	267,903
4832	20	5,751	10,816	3	159	6,166
4833	3		22,464	2	410	15,164
4890	6	5,763	65,597	*	*	*

*Statistical sector, no sample data obtained.

Telephone Communications (Sector 4811)

This sector was developed from detailed interviews with the two major telephone companies serving the Philadelphia region. The five smaller companies within the region were not included in the survey as they were estimated to contribute only 1.5% of the total industry output.

The output of the sector was defined as the total receipts for telephone services, including federal, state, and local taxes. The output of the non-surveyed companies was estimated by multiplying the number of telephone subscribers served by the estimated revenue per subscriber (residential) derived from the sample.

Detailed operating expenditures for the telephone systems were

derived by the respondents from their reports to the Federal Communications Commission (on the basis of the uniform accounts⁽¹⁾) and special tabulations of local vendors. Detailed material inputs were estimated for the smaller firms within broad categories using data provided by the larger firm. Non-material operating expenditures were detailed by both responding firms.

Radio Broadcasting (Sector 4832) and
Television Broadcasting (Sector 4833)

The output of the broadcasting sectors was defined as total broadcast revenues; that is, total time sales less commissions, plus talent and program sales, as derived from the annual reports of the Federal Communications Commission.⁽²⁾

The expenditure data were based on detailed interviews with the larger stations within the study area. The radio broadcasting industry survey response rate was significantly lower than anticipated with only three completed returns from six interviews.

Those stations engaging in both radio and television broadcasting reported their operating expenses on the basis of the individual company's accounting practices.

Communication Services, not elsewhere classified (Sector 4890)

This sector was developed as a statistical sector so that the single telegraphic (SIC 4821) could be included. Output was defined

(1) Federal Communications Commission, Uniform System of Accounts for Class A and Class B Telephone Companies, Rules and Regulations, Part 31. (Washington: U.S. Government Printing Office, 1965).

(2) "Final AM-FM Broadcast Financial Data-1959" Public Notice B-95209 October 17, 1960 and "Final TV Broadcast Financial Data - 1959" Public Notice B-92983, August 31, 1960, Federal Communications Commission, Washington, D.C.

as total receipts including federal excise taxes and state and local taxes. The value of output was estimated by multiplying (1) the output per employee⁽¹⁾ by (2) seasonally adjusted regional employment developed from County Business Patterns.⁽²⁾

The operating expenditures for the sector were estimated from published enterprise information ⁽³⁾, and the personal judgment of the research staff.

ELECTRIC, GAS, AND SANITARY SERVICES

INTRODUCTION

Four basic utility sectors were defined by the Regional Input-Output Study. The sectoring was with regard to common product or service rather than the more restrictive definitions used by the Standard Industrial Classification. The sector definitions and codes are shown in Table 6-8.

Table 6 - 8
Sector Definitions and Codes

Title	RIS Sector	SIC
Electric Companies & Systems	4911	4911, 4931 pt, 4961
Gas Companies & Systems	4920	492, 4932 pt
Water Supply	4941	4941
Sanitary & Other Utility Systems, n.e.c.	4990	4939, 495, 497

The utility sectors are characterized by a few very large firms serving well defined portions of the region. For data the study relied almost exclusively on the excellent responses of these few firms which

(1) Output per employee was estimated from the 1959 Annual Report of the Western Union Telegraph Company.

(2) 1959 Philadelphia SMSA Employment by Industry (Economic Division E) County Business Patterns, RIS Memorandum August 1965.

(3) Annual Report 1959, Western Union Telegraph Company and Internal Revenue Services, SOURCE BOOK OF STATISTICS OF INCOME, 1959-60 Washington: U.S. Department of Treasury, (microfilm); especially industries 422, Telegraph Communications and 429, Communication Services, n.e.c.

comprised a large proportion of the total sector activity. Table 6-9 shows the survey coverage of these sectors.

Table 6 - 9

Survey Coverage

Sector	<u>Regional Estimates</u>	<u>Sample Coverage</u>	
	Output (\$)	Output (\$)	%
4911	308,229,000	293,673,545	95.3
4920	141,887,000	135,311,147	95.4
4941	39,395,000	26,627,066	67.6
4990	5,179,000	*	0
Total	494,690,000		92.1%

*Statistical industry developed from non-survey data.

Electric Companies and Systems (Sector 4911)

The region is dominated by the two responding companies; four other major private utilities and five municipally owned electric utilities⁽¹⁾ provide additional service for small segments of the regions.

Output in this sector was defined as the total revenue received for electric and steam services within the region including federal and state taxes. Steam systems are included in this sector because they are secondary operations of companies covered in the sector. It was estimated that the steam operations did not exceed 2 percent of total output.

The dollar value of output for the region was developed from the estimates of the two respondent firms (the respondent's estimated their regional sales), and from individual estimates of the non-surveyed firms based upon published data and per-capita residential sales provided by the two respondent firms.

(1)

See Statistics for Electric Utilities in Pennsylvania, 1959: Release U-1 (Harrisburg: Pennsylvania Department of Internal Affairs, November 1960.)

The technical coefficients were developed from detailed data provided by the statistical and economic staffs of the respondents. These data conformed to the uniform system of accounts used by the federal regulatory agencies,⁽¹⁾ but were provided in a highly disaggregated form consistent with the RIS sectors.

Gas Companies and Systems (Sector 4920)

This sector is characterized by four large enterprises serving major segments of the region, with smaller operations being conducted by municipally owned systems. The sector was developed from detailed data supplied by three large firms.

The output of the sector was defined as the total revenues received for gas services within the region including federal and state taxes. The revenue estimates for the individual service areas within the region were supplied by the responding companies based on their accounting systems. The non-surveyed portions of the region were estimated on the basis of per-capita residential purchases and estimated industrial purchases.⁽²⁾

The technical coefficients were developed in the same manner as those of the electric utilities. The data furnished conformed to the uniform system of accounts used by the federal regulatory agency⁽³⁾, but were provided by the respondents in a highly disaggregated form consistent with the Regional Input-Output Study sectors.

Water Supply (Sector 4941)

This sector includes both public and private water utility systems.⁽⁴⁾

(1) Federal Power Commission, Uniform System of Accounts described for Public Utility Licensees (Class A and Class B). (Washington: U.S. Government Printing Office, 1965).

(2) "Statistics for Gas Utilities in Pennsylvania, 1959" Release U-2 (Harrisburg: Pennsylvania Department of Internal Affairs, 1960.)

(3) Federal Power Commission, Uniform System of Accounts, prescribed for Natural Gas Companies (Class A and Class B) (Washington: U.S. Government Printing Office, 1964.)

(4) In the five Pennsylvania counties there were 58 water systems: 18 private, 22 municipal, & 18 municipal authorities.

The cost and distribution structures do not appear to differ significantly by type of ownership. The output was defined for (1) private water utilities as the total revenues received for water services and (2) public utilities as the total of current operating expenditures.

The value of output was derived from sample survey information augmented with per-capita consumption estimates for the areas not covered by the sample.⁽¹⁾ The value of output was verified by multiplying output per employee ratios for the surveyed systems by the adjusted employment data.⁽²⁾

The technical coefficients were based upon the detailed information available from three surveyed firms whose output represented more than two-thirds of the total estimated sector output. The data were obtained from the largest public water system within the region and two large private systems; hence the coefficients are slightly biased toward larger scale, more efficient operations.

Sanitary and Other Utility Systems, not elsewhere classified
(Sector 4990)

This sector is the residual utility sector comprised primarily of refuse collectors (SIC 4953) but including to a limited extent private sewerage systems (SIC 4952), irrigation system operations (SIC 4971), and sanitary services, n.e.c. (SIC 4959). Combination companies and systems, n.e.c. (SIC 4939) was included to make the sectoring exhaustive, although no establishments in SIC 4939 were identified within the study area.

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- (1) "Statistics for Water Utilities Including Water Authorities in Pennsylvania, 1959-1960." Release U-4 Harrisburg, Pennsylvania: Department of Internal Affairs, 1961.)
- (2) 1959 Philadelphia SMSA Employment by Industry (Economic Division E) County Business Patterns, RIS Memorandum August 1965.

Unlike the previously discussed utility sectors which included both private and public enterprises, sector 4990 contains only privately owned activities. It was not possible to obtain reliable information from the numerous public sewage authorities and municipal operations. These activities are included within the local government sectors 9301, 9302, and 9303.

Since it was difficult to identify appropriate establishments and obtain reliable data for sector 4990, this sector was developed from secondary sources. The output was defined as the total value of receipts for services rendered within the region including the resale of collected materials where appropriate. The operations of wholesale and retail scrap dealers and secondhand stores were specifically excluded.

Output was estimated on the basis of adjusted employment and payroll data from the County Business Patterns.⁽¹⁾ An assumed wage coefficient of 0.55 (estimated from related sectors 4210, 5093, 5930) was divided into the CBP adjusted payroll of \$1,899,000 to yield a preliminary estimate of output of \$3,453,000. The OASDI coverage in this industry was estimated to be not greater than two thirds of the actual employment; therefore the CBP derived estimate was increased 50 percent to \$5,178,000.

The technical coefficients for this statistical sector were developed from secondary data and estimates based upon survey information from the related sectors 4210, 5093, and 5930.

(1) 1959 Philadelphia SMSA Employment by Industry (Economic Division E)
County Business Patterns, RIS Memorandum August 1965

Regional Input-Output Study
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Chapter 7

WHOLESALE AND RETAIL TRADES

INTRODUCTION

Trade services are utilized by all sectors within the economy. These sectors provide vital linkages among the many sectors within the region, and are the avenues through which the great bulk of the transactions with the rest of the world are completed. The trade sectors exist both as important producers of services and as consumers of materials and services and constitute a growing portion of the metropolitan economy.

Although the trade sectors have been frequently aggregated, in both national and regional studies, it was possible in the Philadelphia study to obtain the detailed goods flow information which enable an analysis of these sectors on a disaggregated basis.

The Philadelphia input-output study, like most others, used dollar value as the basic common denominator in measuring the relevant interindustry transactions. In utilizing such values it was necessary to specify whether the values are in terms of producers' prices, purchasers' values, or some intermediate value within the marketing channel. Conversion of the data from one type of price

to another was required in the construction of the table, as many of the prices were reported as purchasers' values without reference to the value of trade services rendered. As noted in Chapter I, all prices used in developing the final table are in terms of producers' values.

In general the output of the trade services in the input-output study is taken to be "trade margin:" that is, the portion of the purchasers' price which represents the cost of the marketing function which is to be added to the producers' price. "Trade margin" within the industry is generally defined as the value of net sales less the net cost of goods sold.

Chronologically, the trade sectors were the first non-manufacturing sectors developed. The experiences gained in questionnaire design, interviewing techniques and general methodology in these sectors provided valuable insight into the development of the other portions of the study, and pointed up improvements which could have been possible within the manufacturing sectors.

WHOLESALE TRADE

Sector Definitions

Wholesale trade establishments were defined with regard to the Standard Industrial Classification system and the 1958 Census of Business Wholesale Trade. In general, the wholesale trade sectors are comprised of "establishments primarily engaged in selling merchandise to retailers; to institutional, industrial, commercial and professional users; or to other wholesalers; or in negotiating as agents in buying merchandise for or selling merchandise to such persons or companies. Importers selling merchandise at wholesale in the

United States market and exporters are included in wholesale trade.⁽¹⁾

The treatment of secondary products or services produced by wholesale establishments is similar to that in other segments of this study. All secondary products or services in the wholesale trade sector, which included specifically small amounts of manufacturing and retail and other service functions, are classified as wholesale activities and are included in the development of the operating data for the wholesale sectors. Hence, the 2.6% of Census-reported merchant wholesaler sales in Philadelphia region in 1958 which went directly to consumers and farmers,⁽²⁾ normally defined as retail sales, was treated as wholesale activity contributing to the generation of the wholesale margin.

The division of wholesale trade into thirty-four (34) sectors was based on the Standard Industrial Classification system. Table 7-1 indicates the specific wholesale sectors developed in the study. (All wholesale and retail trade sectors were aggregated in sector 69 of the 1958 OBE study.)

Output

The output of a wholesale trade sector is a measure of the amount of value or utility added to the merchandise between the time and place of purchase by the wholesaler and the time and place he sells it. In general this output is defined as the difference between the net sales value (gross sales less returns and allowances) and the net cost of goods purchased, i.e. gross margin. This gross margin includes the

(1) U.S. Bureau of the Census. U.S. Census of Business: 1958, Wholesale Trade, BC58-WA1, United States Summary (Washington: U.S. Government Printing Office, 1961) p. 1-103.

(2) U.S. Bureau of the Census, U.S. Census of Business: 1958 Wholesale Trade, BC58-WA3, Sales by Class of Customer (Washington: U.S. Government Printing Office, 1961) Table 4B, p. 4-41.

Table 7-1
Wholesale Trade
Sector Definitions

RIS Sector	Title	SIC Code
5012	Automobiles & Other Motor Vehicles	5012
5013	Automotive Equipment	5013
5014	Tires & Tubes	5014
5022	Drugs, Drug Proprietarys, & Druggists' Sundries	5022
5028	Paints & Varnishes	5028
5029	Chemicals & Allied Products, not elsewhere classified	5029
5032	Dry Goods, Piece Goods, & Notions	5032
5035	Apparel & Accessories, Hosiery, & Lingerie	5035
5039	Footwear	5039
5042	Groceries, General Line	5042
5043	Dairy Products	5043
5044	Poultry & Poultry Products	5044
5045	Confectionery	5045
5046	Fish & Sea Foods	5046
5047	Meats & Meat Products	5047
5048	Fresh Fruits & Vegetables	5048
5049	Groceries & Related Products, not elsewhere classified	5049
5051	Farm Products, Raw Materials	5051
5062	Electrical Merchandise, General Line	5062
5063	Electrical Apparatus & Equipment, Wiring Supplies, & Construction Materials	5063
5064	Electrical Appliances, Television & Radio Sets	5064
5065	Electronic Parts & Equipment	5065
5072	Hardware	5072
5074	Plumbing & Heating Equipment & Supplies	5074
5077	Air Conditioning & Refrigeration Equipment & Supplies	5077
5082	Commercial & Industrial Machinery, Equipment, & Supplies	5082
5083	Farm Machinery & Equipment	5083
5086	Professional Equipment & Supplies	5086
5087	Equipment & Supplies for Service Establishments	5087
5089	Machinery, Equipment, & Supplies, not elsewhere classified	5088, 5089
5091	Metals & Minerals, exc. Petroleum & Scrap	5091
5092	Petroleum Bulk Stations & Terminals	5092
5093	Scrap & Waste Materials	5093
5099	Miscellaneous Wholesalers, not elsewhere classified	5094, 5095, 5096, 5097, 5098, 5099

value of materials and services consumed in the wholesale trade operations. To the extent that wholesale firms engage in functions other than purchase and resale (such as inventory maintenance; credit extension; assembly, sorting, and grading; break bulk packaging; promotion; and limited manufacturing activities), the associated costs of these operations are also included within the gross margin.

The concept of gross margin (the value of output of the wholesale trade sectors) differs from the notion of "value-added" customarily used in national income accounting practices. "Value-added" is usually defined to exclude the cost of containers, other supplies and materials, fuel, electrical energy, and water purchased from other firms⁽¹⁾, while such costs are included in the output of the trade sectors in this study.

The estimate of the value of output of each of the many wholesale sectors within the Philadelphia region was based on Census data and survey information. This value was obtained by multiplying (1) estimated sector sales by (2) the estimated gross margin per dollar of sales appropriate for the sector.

Wholesale sales within the Philadelphia SMSA for each trade sector for 1958 were estimated from the 1958 Census of Business.⁽²⁾ These 1958 sales values were then adjusted to reflect 1959 levels by means of national wholesale trade reports. Specifically the 1959 level of sales for any wholesale sector was estimated by multiplying (1) the

(1) A special report has been prepared as part of the 1963 Census of Business detailing merchant wholesaling activities. see: U.S. Bureau of the Census Measures of Value Produced In and By Merchant Wholesaling Firms, 1963 (Washington: U.S. Government Printing Office, 1965).

(2) U.S. Bureau of the Census, U.S. Census of Business: 1958, Wholesale Trade, EC58-WA38, Pennsylvania (Washington: U.S. Government Printing Office, 1960) Table 103, p.33-17.

1958 Level of sales in the region by (2) the ratio of the U.S. Sales of that sector in 1959 to the U.S. sales in 1958; and the resulting product was then multiplied by (3) the ratio of the percentage change in personal income in the Philadelphia region 1958-60 to the same change for the United States. The first multiplication reflects the relative sector growths within the national economy. The second multiplication represents a regional adjustment reflecting the differential regional growth rates.

The procedure may be noted as below:

$$\text{Reg. Sales '59} = \text{Reg. Sales '58} \times \frac{\text{U.S. Sales '59}}{\text{U.S. Sales '58}} \times \frac{\frac{\text{Reg. Pers. Income '60}}{\text{Reg. Pers. Income '58}}}{\frac{\text{U.S. Pers. Income '60}}{\text{U.S. Pers. Income '58}}}$$

The annual percentage change 1958-1959 of wholesale sales in the nation by kind of business was calculated from the "Monthly Wholesale Trade Reports."⁽¹⁾ Approximations of the RIS sectors to the reported kind of business classifications were made with the assistance of the Bureau of the Census.⁽²⁾ It was assumed that the annual changes in non-merchant wholesale sales were not significantly different from those of merchant wholesale sales by kind of business.

Although relative change in regional personal income is not ideal as the single estimator of the relative regional change in wholesale sales levels, it

(1) U.S. Bureau of the Census, "Monthly Wholesale Trade Reports" Sales and Inventories, January 1959 and January 1960.

(2) See correspondence with Mr. Harvey Kailin, Chief, Business Division, and Mr. Henry Mulff, Assistant Chief for Census Programs. For a general description of the major differences in classification see the program description in "Monthly Wholesale Trade Reports," September 1964 (BW-64-9), November 10, 1964.

is relevant because a high proportion of wholesale sales are to retailers (approximately 45%) whose sales in turn are sensitive to regional personal income. The regional estimates of personal income for the period 1958 to 1960 indicated an increase of approximately 7.19%.⁽¹⁾ The national increase over the same period was 5.62%.⁽²⁾ Hence, the regional adjustment factor was approximately 1.28.

The estimated 1959 regional wholesale sales by sector were then multiplied by the gross margin per dollar of sales derived from the sample survey data to obtain the estimated outputs. These estimated outputs of the wholesaling sectors are shown in Table 7-2.

Sample Design

The sample survey of the wholesale sectors was developed subject to the constraint that resources were available for no more than 150 interviews. These interviews were allocated among the 34 sectors with regard to magnitude of sales and the data previously provided by the Penn Jersey Transportation Study.

The classification of wholesaling establishments by RIS sector was initially made by means of trade association membership directories, employment security information, and business directories. With these sources it was possible to identify only about two-thirds of the Census reported number of establishments. Complete identification was not possible due to the large number of very small firms and the specialized nature of some wholesaling activities.

The firms to be interviewed were selected using the criteria of maximum coverage of sales within the allotted number of interviews

(1) National Analysts, Inc. "Philadelphia's Position in the Regional and National Economy" Philadelphia Community Renewal Program, Report No. 13. Philadelphia, April 1964. Table 4, p.49.

(2) Office of Business Economics, "Survey of Current Business" National Income, July 1963. Table 4, p.14.

Table 7-2

Estimated Sales and Output of Wholesale Sectors
Philadelphia SMSA: 1959

RIS Sector	Estimated Sales (\$000)	Estimated Output or Margin (\$000)
5012	604,896	29,388
5013	136,124	14,644
5014	72,450	41,853
5022	209,743	28,274
5028	77,872	26,095
5029	545,787	18,944
5032	126,628	16,077
5035	115,882	22,176
5039	31,844	6,595
5042	142,551	10,548
5043	154,060	9,444
5044	70,729	8,960
5045	55,076	10,284
5046	19,475	3,419
5047	194,393	19,530
5048	181,930	22,452
5049	1,126,609	102,493
5051	199,931	5,615
5062	282,170	37,712
5063	140,790	8,865
5064	277,896	43,919
5065	125,542	9,424
5072	76,569	20,000
5074	151,534	21,660
5077	39,761	12,189
5082	696,932	183,865
5083	25,242	2,768
5086	101,752	12,879
5087	58,456	13,694
5089	25,660	3,695
5091	1,351,963	303,597
5092	473,726	65,578
5093	149,949	8,923
5099	<u>1,929,033</u>	<u>509,660</u>
TOTAL	\$9,972,955	\$1,655,219

and a reasonable balance between merchant and non-merchant wholesalers. Table 7-3 indicates the coverage achieved.

Non-merchant Wholesalers

Non-merchant wholesale establishments are primarily manufacturers' sales branches and sales offices. Merchandise agents and brokers, petroleum bulk terminals and plants, liquified petroleum gas facilities, and assemblers, buyers, and associations' engaged in cooperative marketing of farm products are classified also as non-merchant wholesalers.⁽¹⁾ As the non-merchant wholesaler in general does not take either title or possession of the merchandise, the operating cost structure and related margin may differ significantly from those of the merchant wholesaler within the same kind of business.

The sample constructed for the wholesale sectors attempted to duplicate the merchant - non-merchant wholesaler mix reported for each sector in the 1958 Census. Table 7-4 shows the regional and sample proportions. The significantly smaller proportion of non-merchant wholesaler sales in the sample than in the region for three major groups (Dry Goods and Apparel, Groceries and Related Products, and Farm Products) was primarily due to non-response of selected non-merchant wholesalers.

In general it was easier to obtain the required cost information for the study from merchant wholesalers. They tended to be more regionally oriented and more willing to cooperate, especially since typically they were not sales offices of large national firms which impose restrictions upon the release of data.

⁽¹⁾ Bureau of the Budget, Standard Industrial Classification Manual (Washington: U.S. Government Printing Office, 1957) p.147.

Table 7-

Survey Coverage of Wholesale Sectors

SECTOR	SURVEY			REGIONAL ESTIMATES			COVERAGE		
	Establishments RIS	Other (PTS)	Employment Total	Sales (\$'000)	Establishments (1)	Employment (1)	Sales (\$'000)	Establishments %	Employment %
5012	3	1	669	232,226	81	1,953	604,896	4.9	34.3
5013	7	3	1,100	105,108	333	3,411	136,124	3.0	32.2
5014	1	2	207	4,173	60	914	72,450	5.0	22.6
5022	4	2	430	33,198	104	2,872	209,743	5.8	15.0
5028	3	0	260	8,996	56	778	77,872	5.4	33.4
5029	7	0	246	117,748	127	1,982	545,787	5.5	12.4
5032	3	2	75	4,036	130	1,164	126,628	3.8	6.4
5035	3	1	200	6,404	223	2,490	115,882	1.7	8.0
5039	2	2	48	3,273	53	587	31,844	7.5	8.2
5042	3	2	493	49,326	35	1,456	142,551	14.2	33.8
5043	2	3	508	69,401	74	1,626	154,060	6.8	31.2
5044	3	0	109	5,456	83	793	70,729	3.6	13.7
5045	1	2	78	7,137	69	760	55,076	4.3	10.3
5046	3	0	119	11,336	38	250	19,475	7.8	47.6
5047	5	4	700	80,448	165	1,998	194,393	5.5	35.0
5048	6	2	170	13,424	244	1,967	181,930	3.3	8.6
5049	7	9	1,003	145,699	381	3,409	1,126,609	4.2	29.4
5051	2	5	113	59,769	99	546	199,931	7.1	20.7
5062	2	2	306	14,485	218	3,694	282,170	5.0	8.3
5063	5	2	145	39,199	68	344	140,790		42.1
5064	4	4	643	65,932	134	2,956	277,896	11.8	21.7
5065	3	0	775	118,754	117	1,782	125,542	2.2	43.5
5072	2	1	98	4,432	238	1,410	76,569	2.6	6.9
5074	3	1	247	14,634	58	2,244	151,534	1.7	11.0
5077	4	4	313	13,309	827	737	39,761	13.8	42.5
5082	12	11	1,993	106,299	23	3,740	696,932	2.8	53.3
5083	1	2	220	22,870	146	342	25,242	13.0	64.3
5086	2	0	282	11,650	133	2,652	101,752	1.4	10.6
5087	3	1	180	8,251	30	1,446	58,456	3.0	12.0
5089	1	2	66	4,134	297	205	25,660	10.0	32.2
5091	8	0	1,251	70,818	117	5,734	1,351,963	2.7	21.8
5092	2	8	1,038	156,922	400	3,112	473,726	8.5	33.4
5093	2	8	324	51,415	2,014	3,576	149,949	2.5	9.1
5099	4	22	1,226	72,295	7,175	16,069	1,929,033	1.3	7.6
TOTAL	123	108	15,635	\$ 1,732,557		78,999	\$9,972,955	3.2	19.8

() Regional number of establishments indicated is the number reported in the 1958 Census.

(a) Published data do not provide adequate information for disaggregation.

Table 7 - 4

Regional and Sample Non-Merchant Wholesale Sales
as a Proportion of Total Wholesale Sales

RIS Sector Group	Title	Regional ⁽¹⁾ %	Sample %
50	Total Wholesalers	70.1	62.2
501	Motor Vehicles & Auto Equip.	80.4	85.2
502	Drugs, Chemicals & Allied	81.7	90.3
503	Dry Goods & Apparel	45.5	8.0
504	Groceries & Related	67.2	29.2
505	Farm Products	17.5	4.5
506	Electrical Goods	72.3	75.1
507	Hardware, Plumbing, Heating	38.6	16.4
508	Machinery, Equipment & Supplies	55.5	55.4
509	Miscellaneous	55.4	59.1

Questionnaire

The primary data necessary for the completion of the wholesale trade sectors were: (1) sales; (2) purchases for resale; and (3) detailed purchases for operations. The identification of the output, or gross margin requires knowledge of the dollar value of sales and the value of goods purchased for resale (and associated transportation charges, if included).

Functionally, all intermediate and final demand goods pass through a wholesaler. The customary method of identifying the regional flows in other studies appears to have been inquiries made at the extremes of the transactions, i.e. asking only the producer his regional sales distribution, or the final purchaser his regional purchase distribution.

As was noted previously, ⁽²⁾ both approaches were utilized in this study. An additional approach was attempted, namely, each wholesaler was asked to specify the geographic sources of each of his products purchased for resale as well as the geographic distribution of

⁽¹⁾ Census of Business: 1958, Wholesale Trade. Op. Cit.

⁽²⁾ See Chapters 1 and 2 of this report.

the resale of each of these products. The wholesaler, as an assembler of both local and non-local goods for sale to firms within the market area, is generally aware of the product sources since transportation charges may constitute a significant portion of the transaction.

Recognizing the vast array of products usually handled by a single wholesaler, product groupings were developed for each wholesale sector.⁽¹⁾ These groupings were developed from the commodity-line sales of information provided by the Census.⁽²⁾ The prelisting provided the respondents with a manageable number of products indicating the level of desired detail and also served as a check list for products handled. Whereas the pre-listings of material inputs on the manufacturing questionnaires were only partially successful, the product lists for the wholesaling sectors were used by almost all respondents.

Data on operating costs of the wholesale establishments were obtained through a more detailed listing than had been previously attempted.⁽³⁾ Those materials which are commonly consumed within the specific trade sectors were pre-listed on the product sheets. These included office supplies, and detailed packaging supplies. Information was specifically requested on expenditures for the following goods

(1) Facsimilies of the questionnaire, instructions, and product sheets may be found in the appendix to this chapter, pp. 7-26 ff.

(2) U.S. Bureau of the Census. U.S. Census of Business: 1958 Wholesale Trade, BC58-WS5, Commodity-Line Sales (Washington: U.S. Government Printing Office, 1961). Although on a very detailed level there exists slight differences between commodities considered by the Census study and the sectors utilized in the interindustry study, these differences were not significant in the development of the product lists.

(3) See Chapter 2 relating to the experience in the manufacturing sectors in this report.

and services:

- (1) Power and energy
 - (a) Coal
 - (b) Gas
 - (c) Oil
 - (d) Electricity (and steam)
- (2) Advertising and sales promotion
- (3) Rent
- (4) Insurance (non-life)
- (5) Taxes (except wage or income)
- (6) Telephone and telegraph
- (7) Business & professional services (legal, accounting)

Additional information was solicited where applicable on interest payments, banking charges, brokerage fees, and other expenses.

A question was included on the transportation expenses of the wholesaler. This was detailed as to owned and/or operated transport activities and other purchased services. Although actual transportation costs relating to the materials purchased for resale did not enter into the operating calculations, these costs were of considerable interest. These specific costs can provide a check on the validity of the use of the transportation margins developed by the Office of Business Economics for the 1958 U.S. interindustry study since the wholesale function characteristically includes a significant portion of the transportation services on semi-finished or finished goods.

In general the answers to the detailed questions presented on the wholesale trade questionnaire were obtained with relative ease. This experience suggests that a considerable amount of detailed operating

information may be elicited from the regional establishments without a corresponding decrease in the response rate if presented in the proper manner.

Technical Coefficients

The wholesale sectors were the first non-manufacturing segments of the economy investigated. However, the procedures developed for these sectors typify the general approach used for most of the other non-manufacturing sectors. The problem was to adjust the individual returns so as to achieve a uniform treatment of transportation costs. The gross margin was calculated as follows:

Reported Sales Value	
<u>Less: Freight Out</u>	(if included)
Net Sales Value	
<u>Less: Purchases from Resales</u>	
<u>Gross Margin</u>	

Purchases for resale were assumed to include transportation costs from the producer to the wholesaler unless otherwise specified. Likewise, it was assumed that the reported sales included the transportation costs from the wholesaler to the purchaser unless specified as "net of transport." The freight-out costs were calculated using the transportation margins provided by the Office of Business Economics based upon the 1958 Interindustry Study. As noted previously⁽¹⁾ the use of these transportation margins to calculate the transportation costs at any intermediate stage between the producer and the final consumer tends to overstate the total transportation expenditures.

⁽¹⁾ See Chapter 2, pp 38-41 Supra.

The calculation of the gross margin, as shown above, was made from the specific items listed in the sample questionnaire. Where data elements were missing from the returns of individual establishments, they were estimated on the basis of comparable returns from other establishments or information available from trade associations or special studies.

The allocation of packaging supplies when not disaggregated on the questionnaire, was generally made to those RIS sectors providing the packing supplies typically associated with the commodities handled. A significant problem with this allocation was found only within the food wholesaling sectors (504) where break bulk packaging constituted a significant portion of the wholesalers' activities.

Data on the annual average number of employees and the total annual wages and salaries were checked against wages per employee ratios calculated from the 1958 Census of Business, and the 1959 County Business Pattern.

Within any given period, inventories may be important "suppliers" or "consumers" of goods. However, in general it was the judgment of the study staff that the information available concerning regional inventory change was inadequate, both in terms of measurement and effectiveness of reporting. Therefore, no real effort was made to adjust the table for inventory changes. Changes in inventory levels at the wholesale or retail trade levels were not specifically included in the calculations of output. Exceptions to this procedure were made for those establishments which indicated that they incurred significant changes in inventory levels for the period reported.

It should also be noted that there was no attempt to reconcile the various accounting valuation procedures (e.g. LIFO, FIFO, etc.).

The specific accounting procedures used by the establishments were accepted, since it was judged that the validity of the primary data did not warrant such detailed adjustments.

RETAIL TRADE

Sector Definitions

Retail trade sectors were defined on the basis of the Standard Industrial Classification system and the 1958 Census of Business: Retail Trade. In general the retail trade sectors are comprised of "...establishments engaged in selling merchandise for personal, household or farm consumption and rendering services incidental to the sale of the goods."⁽¹⁾ The definitions by kind of business were consistent with those utilized in the 1958 Census of Business: Retail Trade, except that retail liquor stores operated by the state government (Pennsylvania Liquor Control Board) were excluded from sector 5921. Both the Census and the study exclude from retail coverage "...places of business operated by institutions and open only to their own members or personnel, such as restaurants and bars operated by clubs, school cafeterias, eating places operated by industrial and commercial enterprises for their own employees, establishments operated by agencies of the Federal Government on military posts, hospitals, etc." ⁽²⁾

The treatment of secondary products or services produced by retail trade establishments is similar to that in other segments of the study. All secondary activity is included with the primary classification;

⁽¹⁾ Bureau of the Budget, Standard Industrial Classification Manual (Washington: U.S. Government Printing Office, 1957) p. 153.

⁽²⁾ U.S. Bureau of the Census, U.S. Census of Business: 1958, Retail Trade BC58-RA38, Pennsylvania (Washington: U.S. Government Printing Office, 1960) p. 38-114.

hence, although restaurants prepare food, feed stores grind grains, etc., these activities are considered retail in nature.

The division of retail trade into forty sectors was based upon the Standard Industrial Classification system. Table 7-5 indicates the specific retail sectors developed in the study. As noted previously, all wholesale and retail sectors were combined in sector 69 in the 1958 OBE study.

OUTPUT

The output of a retail trade sector is a measure of the amount of value or utility added to the merchandise between the time and place of purchase by the retailer and the time and place he sells it. As in wholesale trade, this output is generally defined as the difference between the net sales value and the net cost of goods purchased, i.e. gross margin. This gross margin includes the value of materials and services consumed by the retailer.

The estimate of value of output for each of the many retail sectors within the Philadelphia region was based on Census data and survey information. Similar to the procedure used in the wholesale trade sectors, the value of output was obtained by multiplying (1) estimated sector sales by (2) estimated gross margin per dollar of sales appropriate for the sector.

The retail sales for 1958 within the Philadelphia SMSA by each of the forty sectors were estimated from the 1958 Census of Business.⁽¹⁾ These 1958 sales values were then adjusted to reflect 1959 levels by means of national retail trade reports. Specifically, the 1959 level of sales for any retail sector was estimated by multiplying (1) the

⁽¹⁾U.S. Bureau of the Census, U.S. Census of Business: 1958. Retail Trade BC58-RA38 Pennsylvania (Washington: U.S. Government Printing Office, 1960) Table 103, pp. 38-34-35.

Table 7-5

Retail Trade
Sector Definitions

RIS Sector	Title	SIC Code
5210	Lumber & Other Building Materials Dealers	521
5221	Heating & Plumbing Equipment Dealers	5221
5231	Paint, Glass, & Wallpaper Stores	5231
5241	Electrical Supply Stores	5241
5250	Hardware Stores & Farm Equipment Dealers	525
5311	Department Stores	5311
5342	Mail Order Houses & Merchandise Vending Machine Operators	534, 532
5331	Limited Price Variety Stores	5331
5351	Direct Selling Organizations	5351
5390	Miscellaneous General Merchandise Stores	539
5411	Grocery Stores	5411
5420	Meat & Fish Markets	542
5431	Fruit Stores & Vegetable Markets	5431
5441	Candy, Nut, & Confectionery Stores	5441
5460	Retail Bakeries	546
5490	Miscellaneous Food Stores, not elsewhere classified	5451, 549
5511	Motor Vehicle Dealers	5511
5521	Motor Vehicle Dealers, (used cars only)	5521
5531	Tire, Battery, & Accessory Dealers	5531
5541	Gasoline Service Stations	5541
5599	Miscellaneous Aircraft, Marine, & Automotive Dealers	5599
5610	Men's & Boys' Clothing & Furnishings Stores	561
5621	Women's Ready-to-Wear Stores	5621
5630	Women's Accessory & Specialty Stores	563
5641	Children's & Infants' Wear Stores	5641
5651	Family Clothing Stores	5651
5660	Shoe Stores	566
5690	Miscellaneous Apparel & Accessory Stores, not elsewhere classified	5671, 5681, 5699
5710	Furniture, Home Furnishings, & Equipment Stores	571
5722	Household Appliance Stores	5722
5730	Radio, Television, & Music Stores	573
5812	Eating Places	5812
5813	Drinking Places	5813
5912	Drug Stores & Proprietary Stores	5912
5921	Liquor Stores	5921
5940	Book & Stationery Stores	5940
5950	Sporting Goods Stores & Bicycle Shops	595
5971	Jewelry Stores	5971
5980	Fuel & Ice Dealers	598
5990	Retail Stores, not elsewhere classified	593, 596, 599

1958 level of sales in the region by (2) the ratio of the U.S. sales of that sector in 1959 to the U.S. sales in 1958, and the resulting product was then multiplied by (3) the ratio of percentage change in personal income in the Philadelphia region 1958-1960 to the same change for the nation. The first multiplication reflects the relative sector growths within the national economy. The second multiplication represents a regional adjustment reflecting the differential regional growth rate.

The general procedure may be represented as:

$$\text{Reg. Sales '59} = \text{Reg. Sales '58} \times \frac{\text{U.S. Sales '59}}{\text{U.S. Sales '58}} \times \frac{\frac{\text{Reg. Pers. Income '60}}{\text{Reg. Pers. Income '58}}}{\frac{\text{U.S. Pers. Income '60}}{\text{U.S. Pers. Income '58}}}$$

The annual percentage change 1958-1959 of retail sales in the nation by kind of business was calculated from the "Monthly Retail Trade Reports."⁽¹⁾ Approximations of the RIS sectors to the reported kind of business classifications were made with reference to the technical study of the Bureau of the Census⁽²⁾ and Census staff assistance.

The relatively high proportion of personal income spent for goods and materials purchased from the retail sectors suggests that relative regional change in personal income may be used as a reasonable regional adjustment.⁽³⁾

The estimated 1959 regional retail trade sales by sector were multiplied by the gross margin per dollar of sales derived from the sample

⁽¹⁾ U.S. Bureau of the Census. "Monthly Retail Trade Report" Retail Sales. December 1959.

⁽²⁾ Max H. North and Ralph S. Woodruff, Reconciliation of the 1958 Census of Retail Trade with the Monthly Retail Trade Report, Bureau of the Census Technical Paper No. 9, (Washington: U.S. Government Printing Office, 1963).

⁽³⁾ For adjustment data, see Supra. pp. 8-9.

survey data to obtain the estimated outputs. These estimated outputs for the forty retail sectors are shown in Table 7-6.

SAMPLE DESIGN

Time-cost constraints severely restricted the gathering of primary data on retail trade. These constraints and the large number of retail establishments within the region (43,952) led to the decision to use a mail questionnaire. The cost consideration limited the total number of questionnaires sent to 1100. These were allocated among the retail trade sectors in proportion to the number of establishments in each sector as reported by the Census. This allocation was then adjusted to reflect the availability of data provided by the Regional Economic Survey of the Penn Jersey Transportation Study. See Table 7-7.

The identification of the establishments by RIS sector to be included within the sample survey was substantially more difficult than in the manufacturing and wholesaling sectors since there did not exist an exhaustive listing of regional retail establishments. Thus the sample was drawn largely from the classified telephone directories and to the extent possible from the published trade directories and market lists.

The sample was segmented to maintain a general locational balance between the establishments within the central urban area (i.e. the City of Philadelphia) and those in the suburban counties. In general, 10% was chosen within Bucks County, Pennsylvania; 10% within the three New Jersey counties; 10% within the remaining suburban Pennsylvania counties; and the remaining from within the City of Philadelphia.

Table 7-6

Estimated Sales and Output of Retail Trade Sectors
Philadelphia SMSA: 1959

RIS Sector	Estimated Sales (\$000)	Estimated Output or Margin (\$000)
5210	143,342	51,676
5221	10,517	3,305
5231	18,541	6,889
5241	3,509	1,110
5250	62,132	19,684
5311	450,872	185,382
5331	86,780	35,899
5342	186,985	106,953
5351	176,852	73,889
5390	82,087	30,699
5411	1,033,109	196,364
5420	95,407	25,271
5431	22,670	5,771
5441	25,887	12,025
5460	38,356	18,305
5490	19,676	7,210
5511	727,498	216,052
5521	53,715	9,416
5531	45,989	12,531
5541	269,011	63,806
5599	10,963	4,124
5610	83,197	32,436
5621	120,960	46,684
5630	33,648	14,143
5641	17,178	6,418
5651	33,671	15,670
5660	66,967	23,852
5690	20,218	11,294
5710	138,055	57,007
5722	69,942	17,757
5730	32,707	10,802
5812	316,032	183,929
5813	156,409	84,151
5912	166,656	58,430
5921	24,253	4,781
5940	14,241	7,532
5950	11,722	4,112
5971	30,764	12,281
5980	156,785	53,202
5990	163,504	71,604
TOTAL	<u>5,220,807</u>	<u>1,802,446</u>

Table 7-7

Survey Response and Coverage
by Retail Trade Sectors

RIS Sectors	Number of Establishments		Number of Returns		RIS Response %	Total Coverage %
	Total in Region ^(a)	Sample	RIS	PJTS		
5210	557	15	4	11	26.7	2.7
5221	115	2	1	1	50.0	2.6
5231	228	6	1	16	16.7	7.5
5241	55	1	1 (b)	1	0.0	3.6
5250	850	22	5	13	22.7	2.1
5311	39	2	17 (c)	0	0.0	43.6
5331	458	15	3	4	20.0	1.5
5342	307	6	4 (b)	3	50.0	2.3
5351	1,978	19	2 (b)	0	5.3	0.1
5390	995	14	5	7	35.7	1.2
5411	6,106	110	288 (d)	10	4.5	4.7
5420	1,245	22	3	8	13.6	0.9
5431	617	11	2 (b)	0	9.1	0.3
5441	1,224	22	4	4	18.2	0.7
5460	744	13	1	4	7.7	0.7
5490	493	11	2	1	18.2	0.6
5511	616	24	6	7	25.0	2.1
5521	353	7	2	0	28.6	0.6
5531	345	10	2	2	20.0	1.2
5541	3,237	112	13	10	8.9	0.7
5599	130	8	2	1	25.0	2.3
5610	748	24	5	22	20.8	3.6
5621	961	27	2	12	7.4	1.5
5630	624	18	1	19	5.5	3.2
5641	337	10	5	14	50.0	5.6
5651	248	7	1	2	14.3	1.2
5660	811	25	10	12	40.0	2.7
5690	273	7	1	2	14.3	1.1
5710	1,381	37	6	20	16.2	1.9
5722	485	13	4	5	30.8	1.9
5730	425	12	2	7	16.7	2.1
5812	5,381	156	14	8	9.0	0.4
5813	3,530	129	8	0	6.2	0.2
5912	1,817	47	7	15	14.9	1.2
5921	213	15	3	0	20.0	1.4
5940	261	7	0	4	0.0	1.5
5950	227	6	0	3	0.0	1.3
5971	482	12	0	7	0.0	1.5
5980	835	21	3	1	14.3	0.5
5990	<u>3,662</u>	<u>93</u>	<u>7</u>	<u>39</u>	<u>7.5</u>	<u>1.3</u>
	43,393	1,118	447	296	13.9	1.7

^a 1958 data from Census of Business: Retail Trade. This excludes establishments without payroll which were not classified by the Census at this detail.

^b Includes one statistical establishment to avoid disclosure.

^c No mail questionnaires were returned, five enterprises were obtained by personal interview using the detailed questionnaire. The five enterprises represent 17 establishments.

^d Five mail questionnaires were returned, additionally four enterprises were obtained by personal interview using detailed questionnaires. The four enterprises personally interviewed represented approximately 27% establishments.

QUESTIONNAIRE

The mail questionnaire for the retail trade sectors was developed with emphasis on brevity, anonymity and ease of completion. It was originally anticipated that the information in the RIS survey would augment the 296 returns available from the Penn Jersey Transportation Study and would be used to detail further the information available from the IRS statistics.⁽¹⁾

The questions were of a general nature which could readily be answered with minimum recourse to the records of the establishment. Requesting dollar values was avoided in order to increase the response rates. The only information in dollar terms which was requested was an indication of the general magnitude of total sales.

On the reverse side of the questionnaire the respondent was requested to circle the listed category which best described his operations. This provided a check against the initial classification of the establishment in the selection process.

To augment the first mail questionnaire which was not as successful as anticipated, a second form was used which requested the dollar values on all items rather than percentages of sales. This questionnaire was used only after the stock of initial questionnaires was exhausted, and generally a second letter was sent with the questionnaire to non-responding establishments. It was possible to ascertain the differences in response to the two forms of questionnaire since the second was used as a follow-up to the reminder letter or telephone call where there was no response to the first questionnaire.

(1)

Internal Revenue Service, Source Book of Statistics of Income, 1959-60. Washington: U.S. Department of Treasury (microfilm).

A more detailed questionnaire was developed for the major retail establishments similar in design to the wholesale questionnaire. This questionnaire was used exclusively for the department stores (sector 5311), and chain grocery stores (sector 5411). Data obtained from the major retailers tended to conform more to the specific accounting practices of the industry and the enterprise than to the needs of the input-output study.

Technical Coefficients

The methodology used in deriving the technical coefficients in the retail trade sectors was similar to that developed for the wholesale trade sectors.⁽¹⁾ The percentage distributions of expenditures based on total sales value obtained from the first type of mail questionnaires were initially transformed into dollar values for each firm by multiplying each of the expense percentages by the median of the total sales class within which the firm was reported. These resulting dollar values were then aggregated with the dollar value data available from the second type of questionnaire and the returns of the Penn Jersey Transportation Study.

The cost of goods purchased was estimated by multiplying the percentage provided by the respondent (defined as cost of goods purchased for resale divided by total sales) by the median of the total sales value class noted. The gross margin was then determined as the median value of the sales class noted less the cost of goods purchased for resale.

Wage and salary proportions were calculated from the information provided in the 1958 Census of Business: Retail Trade. Labor coefficients were derived as follows;

(1) See pp. 7-14-16, Supra.

$$\frac{1958 \text{ Census reported Payroll}}{1958 \text{ Census reported Sales}} \times \frac{\text{Sample Sales}}{\text{Sample Gross Margin}} = \text{Labor Coefficient (9888)}$$

The major retail trade sectors interviewed by means of the detailed questionnaires (sectors 5311 and 5411) were developed in the same manner as the wholesale trades.

As previously noted ⁽¹⁾ no attempts were made in the retail trade sectors to adjust for inventory valuation methods or inventory change, except when the respondent considered the change to be sufficiently significant so as to volunteer the information.

(1) See p.7-15, Supra.

APPENDIX

CHAPTER 7

Wholesale and Retail Trades

Wholesale Trade

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Instructions	7-32
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Retail Trade

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Mail Questionnaire (Initial type) front	7-39
Mail Questionnaire (Initial type) back	7-40
Mail Questionnaire (Second type)	7-41
Interview Questionnaire	7-42

UNIVERSITY of PENNSYLVANIA

PHILADELPHIA 4

*Wharton School of
Finance and Commerce*

Dr. Walter Isard, who is a member of the Governor's Council of Science and Technology and Professor of Economics and Regional Science, the Wharton School, is conducting a major study on the economy of the Philadelphia metropolitan region. This study is important because it will assist the Council, business groups, state and city governments, and other important bodies, in identifying the types of industries which would be most desirable to promote in the Philadelphia region.

As you are aware, the city of Philadelphia itself is experiencing an undesirably high rate of unemployment. It is therefore essential, both from the standpoint of eliminating unemployment in the Philadelphia area and for stimulating the growth of the Philadelphia area, that we give Dr. Isard all the encouragement and assistance we can in completing his important study.

Dr. Isard is constructing a detailed sales and purchases table in order to reveal the different markets that exist for different products in the Philadelphia region. To do this it is necessary to obtain information from your firm as well as others. Your name has been selected as part of a sample of the over 7100 wholesale establishments in this region.

You can rest assured that whatever data you provide him will be kept in strictest confidence, and no data will be published which would reveal information on individual firms.

I would therefore greatly appreciate it if you would cooperate with Dr. Isard in supplying the information he requests. Dr. Isard or one of his associates will shortly be in touch with you on this matter.

Enclosed is a copy of a letter from Pennsylvania's Secretary of Commerce, John K. Tabor, indicating the State's interest in the study.

Sincerely yours,

Willis J. Winn,
Dean

WJW/ljb
Encl.

REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

WHOLESALE ACTIVITIES

Information is requested for the calendar year 1959. ~~If it is not possible to provide data for 1959, please use the nearest available year.~~
If this questionnaire is completed for any period other than the calendar year 1959, please indicate the year used. 19__.

Please report information for all wholesaling activities of this firm within the Philadelphia region.

The Philadelphia Standard Metropolitan Statistical Area (SMSA) is comprised of the counties of: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey as indicated on the attached map.

If any questions arise with regard to specific items in this questionnaire, please call:

Mr. Thomas W. Langford
Dept. of Regional Science
University of Pennsylvania
(215) 594-7737

Name of Establishment: _____

Address of Establishment: _____

Respondent's Name: _____

Respondent's Title: _____

Average Annual Employment:* _____

Total Annual Wages and Salaries* \$ _____

*See instruction sheet for specific definitions of these terms.

Sample:

B. SALES - If data are not available, please use your best estimate.

[illegible]

C. ANNUAL EXPENDITURES FOR POWER AND ENERGY

- a. Coal
- b. Gas
- c. Oil
- d. Electricity

D. TRANSPORTATION EXPENSES

- a. What is your total annual transportation expense? \$ _____
- b. Do you own or operate your own transportation vehicles?

Yes

☐

No

☐

If yes, please estimate the following transport related expenses.

Wages and Salaries	\$ _____
Maintenance and Repairs	\$ _____
Fuel and Oil	\$ _____
Other Operating Expenses	\$ _____
Total	\$ _____

E. OTHER CURRENT OPERATING EXPENSES, not included above.

Advertising and sales promotion

Rent

Insurance

Taxes (except wage or income)

Telephone and telegraph

Business and professional services (legal, acc't.)

INSTRUCTIONS

REGIONAL IMPACT STUDY
University of Pennsylvania

We have attempted to keep the accompanying questionnaire short and simple. Most of the definitions below are those commonly used by the U. S. Bureau of the Census and are likely to have been calculated for previous census returns.

If data are not available in the form requested, please estimate the values rather than leaving the question blank.

1. Average Annual Employment

As defined by the U. S. Bureau of the Census, this represents the average of all full time and part time employees on the payrolls of the establishment who worked or received pay for any part of the pay period ending nearest the 15th of the months of March, May, August, and November. Included are all persons on paid sick leave, paid holidays, and paid vacations during these periods. Excluded are members of the armed forces and pensioners carried on the active rolls but not working during the period. Officers of corporations are included as employees; however, proprietors and partners of unincorporated firms are excluded.

2. Total Annual Wages and Salaries

This total includes the gross earnings paid during the calendar year to all employees on the payroll of the establishment as described above. This includes commissions, dismissal pay, all bonuses, vacation and sick-leave pay, and compensation in kind. You may use the information from census returns or federal withholding tax reports.

3. Purchases

Please include in this schedule the products purchased in the operations of your firms as well as those purchased for resale. The classification of products may be found on the supplementary sheets. If any category of products accounts for 5% or more of your total sales and does not appear on the classification sheet, please indicate, using the reverse side of the schedule for a description of the group. If any problems arise in the classification of products please call the study offices.

Transport Costs - Costs of purchases should be the amounts paid (after discounts and allowances) for goods and products. These prices should include freight charges if possible. (If freight charges are excluded or if you pick up in your own trucks, please note).

Origin of Purchasers:Producers

Those establishments primarily engaged in the production or manufacture of goods and products.

Wholesalers

Those non-manufacturing establishments engaged in selling goods to retail and wholesale trading establishments, or to industrial, commercial, institutional and professional users.

Others

Establishments from which you purchase, and you do not believe that they fall into either of the two above categories. Please describe these firms in detail.

Note that the percentages in each of the rows should add to 100.

4. Sales

Please include in this schedule only those products which you have sold. All product classes reported on schedule "A" (Purchases) as purchased for resale, should be shown on schedule "B". Sales value or billings should be after all discounts and allowances; f.o.b. your establishment. (If freight charges can not be excluded, or if you deliver in your own trucks, please indicate so in the appropriate column.)

Distribution of Sales to Purchasers:

Retailers

This category of purchaser includes all establishments engaged in selling merchandise for personal, household or farm consumption, and rendering services incidental to the sale of such goods.

Wholesalers

See page 1

Manufacturers

See producers, page 1

Households

This category includes only those sales directly to individuals as consumers of the goods and services.

Governments

This category of purchasers includes all agencies of the various Federal, State, County and Local governments.

Institutions

This category includes public and parochial educational facilities, colleges and universities, hospitals, libraries, hotels, fraternity houses, lodges, etc. Note that restaurants are classified as retail establishments.

501 MOTOR VEHICLES AND AUTOMOTIVE EQUIPMENT

5012 Automobiles and other motor vehicles
 5013 Automotive equipment
 5014 Tires and tubes

Products purchased for resale:

A	Motor vehicles, new, complete	3711
B	Motor vehicle parts & accessories, new	3714
C	Motor vehicle parts & accessories, used	5521
D	Truck trailers	3715
E	Motorcycles, bicycles & parts	3751
F	Mobile homes	3791
G	Tires & tubes	3011
H	Gasoline, kerosene, distillates	2911
I	Lubricating oils & greases	2992
J	Paints, varnishes, lacquers & enamels	2851
K	Auto waxes & polishes	2842
L	Radios & TV sets	3651
M	Household appliances	363-
N	Sporting & athletic goods	3949

Please specify any other products which compose
 5% or more of your purchases;

O
 P
 Q
 R

Products purchased for operation:

1	Stationery	2621
2	Envelopes of all kinds including industrial	2642
3	Pens, pencils & other office materials	395-
4	Bags	2643
5	Cordage & twine	2298
6	Coarse wrapping paper	2621

5022

DRUGS, DRUG PROPRIETARIES AND DRUGGISTS' SUNDRIES

Products purchased for resale:

A	Pharmaceuticals	2834
B	Proprietaries	2834
C	Biologicals	2831
D	Botanicals & other druggists' chemicals	2833
E	Cosmetics, toiletries, perfumes	2844
F	Sanitary paper products	2647
G	Photographic equipment & supplies, including film	3861
H	Cigarettes	2111
I	Cigars & other tobacco products	212-3
J	Confectionery	207-
K	Pens, pencils, & office & artists materials	395-
L	Games & toys	3941
M	Household appliances	363-
N	Radio & TV sets	3651
O	Clocks, watches, & parts	3671
P	Glass containers	3221
Q	Plastic containers	3079

Please specify any other materials which compose
5% or more of your total purchases.

Products purchased for operations:

1	Stationery	2621
2	Envelopes of all kinds	2642
K	Pens, pencils, & other office materials	395-
4	Bags	2643
5	Cordage & twine	2298
6	Coarse wrapping paper	2621
7	Paper board containers & boxes	265-
P	Glass containers	3221
Q	Plastic containers	3079
10	Wooden containers	254-

507 HARDWARE, AND PLUMBING AND HEATING EQUIPMENT AND SUPPLIES (part)

- 5074 Plumbing and heating equipment and supplies
 5077 Air conditioning and refrigeration equipment and supplies

Products purchased for resale:

A	Plumbing fixtures, fittings, & trim (brass goods)	3432
B	Enameled iron & metal sanitary ware	3431
C	Vitreous & semivitreous porcelain sanitary ware	3261
D	Cast iron pipes, soil pipes, etc.	3321
E	Steel pipe & tubing	3317
F	Copper pipe & tubing	3351
G	Heating equipment	3433
H	Air conditioning & refrigeration equipment	3585
I	Refrigerant gases	2813
J	Hardware	342-
K	Household appliances	363-
L	Radio & TV sets	3651
M	Ducts, sheet metal	3444

Please specify any other products which compose
 5% or more of your purchases.

Products purchased for operations:

1	Stationery	2621
2	Envelopes, all kinds	2642
3	Pens, pencils, & other office materials	395-
4	Bags	2643
5	Coarse wrapping paper	2621
6	Paper board containers & boxes	265-
7	Wooden containers	254-

5091 METALS AND MINERALS, EXCEPT PETROLEUM PRODUCTS
 5093 SCRAP AND WASTE MATERIALS

Products purchased for resale:

A	Semi-finished iron & steel products	3312
B	Sheet, strip, & bar steel (cold rolled)	3316
C	Sheet, strip & bar steel (hot rolled) incl. tinplate	3312
D	Iron & steel wire & wire products	3315
E	Steel pipes & tubes	3317
F	Cast iron pipe & other gray iron castings	3321
G	Stainless steel	3312
H	Copper & brass, shapes, forms, & other mill products	3351
I	Aluminium, shapes, forms, & other mill products	3352
J	Crude or refined lead	3332
K	Crude or refined zinc	3333
L	Crude or refined non-ferrous metals, n.e.c.	3339
M	Precious metals	3341
N	Used automotive parts & equipment	5521
O	Railroad transportation equipment	374-
P	Iron & steel scrap (if industrial, identify source industry)	
Q	Non-ferrous metal scrap (if industrial, identify source industry)	
R	Waste paper	
S	Waste rags, textile waste, wiping cloths	

Please specify any other products which compose
 5% or more of your purchases.

Products purchased for resale:

1	Stationery	2621
2	Envelopes, all kinds	2642
3	Pens, pencils, & other office materials	395-
4	Wooden containers	254-

UNIVERSITY of PENNSYLVANIA

PHILADELPHIA 19104

*Wharton School of
Finance and Commerce*

Regional Impact Study

Dear Sir:

The Wharton School of the University of Pennsylvania has recently undertaken a large scale study of the Philadelphia metropolitan region and its economy. The study is concerned with the inter-relationships of the various sectors of the economy and the relationship of the region to the rest of the nation.

The study will permit the analysis of changes in the economy and will be of significant value to those agencies concerned with the vital problems of unemployment, relocation and renewal, and general economic growth.

The Philadelphia metropolitan area, comprised of the counties of Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey, contains in excess of 44,000 retail establishments.

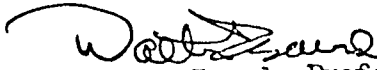
In an attempt to gain insight into the operations of this major sector of the economy, your establishment has been statistically selected and we hope you will respond to the enclosed questionnaire.

Recognizing the value of your time, we have attempted to make the few questions as short and concise as possible. These questions may be completed in less than five minutes and will substantially improve our knowledge of the retail operations in this region.

As you will note, the questions are so constructed so as not to disclose absolute values of your expenditures. You may rest assured that no information will be published which might identify individual establishments.

If you have any questions regarding the study or the enclosed questionnaire, we will be most pleased to assist you in any way possible. Please call Mr. Thomas W. Langford at 594-7737. Thank you for your kind cooperation.

Respectfully yours,


Walter Isard, Professor
Economics and Regional
Science

WI/cva

Enclosures

Wharton School of Finance & Commerce
University of Pennsylvania

REGIONAL IMPACT STUDY

I. Please indicate the percentages of total sales represented by your business expenditures in the following categories. These values may be obtained by dividing the purchases in the appropriate categories by the total sales value for the year.

a. Cost of goods purchased	_____	%
b. Rent (indicate if owned)	_____	%
c. Energy (oil, gas, electricity)	_____	%
d. Telephone & telegraph	_____	%
e. Packaging (bags, containers, wrappings, etc.)	_____	%
f. Insurance (except unemployment or hospitalization)	_____	%
g. Professional services (legal, accounting, etc.)	_____	%

II. What percent of your goods are purchased within the Philadelphia Standard Metropolitan Statistical Area? _____ %

III. The total sales volume in the reported period was:
(please check the appropriate box)

- ☐ less than \$ 50,000
- ☐ \$ 50,000 to \$149,999
- ☐ \$150,000 to \$499,999
- ☐ \$500,000 to \$999,999
- ☐ \$1,000,000 and over

IV. Average annual employment _____

V. This information is for the year 19_____

PLEASE CIRCLE THE NUMBER OF THE CATEGORY BEST DESCRIBING YOUR OPERATIONS (i.e. responsible for 50% or more of your business receipts).

BUILDING MATERIALS, HARDWARE, & FARM EQUIPMENT:

- 521 Lumber and Other Building Materials Dealers
- 522 Heating and Plumbing Equipment Dealers
- 523 Paint, Glass, and Wallpaper Stores
- 524 Electrical Supply Stores
- 525 Hardware and Farm Equipment

GENERAL MERCHANDISE:

- 531 Department Stores
- 532 Mail Order Houses
- 533 Limited Price Variety Stores
- 534 Merchandise Vending Machine Operators
- 535 Direct Selling Organizations (door to door)
- 539 General Merchandise Stores

FOOD:

- 541 Grocery Stores
- 542 Meat and Fish Stores
- 543 Fruit Stores and Vegetable Markets
- 544 Candy, Nut, and Confectionary Stores
- 545 Dairy Products Stores
- 546 Retail Bakeries
- 549 Misc. Food Stores (not covered above)

AUTOMOBILE DEALERS & GASOLINE STORES:

- 551 Motor Vehicle Dealers
- 553 Tire, Battery, and Accessory Dealers
- 554 Gasoline Service Stations
- 559 Misc. Marine, Aircraft, and Motorcycle Dealers

APPAREL & ACCESSORIES:

- 561 Men's and Boy's Clothing and Furnishings Stores
- 562 Women's Ready-to-wear Stores
- 563 Women's Accessory and Specialty Stores
- 564 Children's and Infant's Wear Stores
- 565 Family Clothing Stores
- 566 Shoe Stores
- 567 Custom Tailors
- 568 Furriers and Fur Shops
- 569 Misc. Apparel and Accessory Stores (not covered above)

FURNITURE, HOME FURNISHINGS, & EQUIPMENT:

- 571 Furniture, Home Furnishings, and Equipment Stores
- 572 Household Appliance Stores
- 573 Radio, Television, and Music Stores

EATING & DRINKING PLACES

- 5812 Eating Places
- 5813 Drinking Places (alcoholic beverages)

OTHERS:

- 591 Drug Stores and Proprietary Stores
- 592 Liquor Stores
- 593 Antique Stores and Second-hand Stores
- 594 Book and Stationery Stores
- 595 Sporting Goods Stores and Bicycle Shops
- 596 Farm and Garden Supply Stores
- 597 Jewelry Stores
- 598 Fuel and Ice Dealers
- 5992 Florists
- 5993 Tobacconists
- 5994 News dealers and Newstands
- 5996 Camera and Photographic Supply Stores
- 5997 Gift, Novelty, and Souvenir Shops
- 5998 Optical Goods Stores

OTHER: (please specify)

WHARTON SCHOOL OF FINANCE AND COMMERCE
University of Pennsylvania

REGIONAL IMPACT STUDY

I. Please indicate the dollar amounts of your business expenditures in the following categories for the year:

- a. Cost of goods purchased for resale \$ _____
- b. Rent (indicate if owned) \$ _____
- c. Energy (heat, light, power) \$ _____
- d. Telephone \$ _____
- e. Packaging (bags, containers, paper) \$ _____
- f. Insurance (except unemployment comp.) \$ _____
- g. Professional services (legal & accounting) \$ _____

II. Total wages and salaries paid to employees for the year

\$ _____

III. Average annual number of employees

IV. What percent of your purchases are made within the Philadelphia metropolitan area? _____%

V. What was your total dollar value of sales (receipts) for the year?

\$ _____

Thank you

~~CONFIDENTIAL~~

REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

RETAIL TRADES

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If this questionnaire is completed for any period other than the calendar year 1959, please indicate the year used. 19 ____.

Please report information for all retailing activities of this firm within the Philadelphia region.

The Philadelphia Standard Metropolitan Statistical Area (SMSA) is comprised of the counties of: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey as indicated on the attached map.

If any questions arise with regard to specific items in this questionnaire, please call:

Mr. Thomas W. Langford
Dept. of Regional Science
University of Pennsylvania
(215) 594-7737

Name of Establishment: _____

Address of Establishment: _____

Respondent's Name: _____

Respondent's Title: _____

Average Annual Employment:* _____

Total Annual Wages and Salaries* \$ _____

*See instruction sheet for specific definitions of these terms.

[illegible]

B. SALE If data are not available, please use your best estimate.

PERCENTAGE OF SALES TO:

[illegible]

C. ANNUAL EXPENDITURES FOR POWER AND ENERGY

- a. Coal
- b. Gas
- c. Oil
- d. Electricity

D. TRANSPORTATION EXPENSES

- a. What is your total annual transportation expense? \$ _____
- b. Do you own or operate your own transportation vehicles?

Yes

☐

No

☐

If yes, please estimate the following transport related expenses.

Wages and Salaries	\$ _____
Maintenance and Repairs	\$ _____
Fuel and Oil	\$ _____
Other Operating Expenses	\$ _____
Total	\$ _____

E. OTHER CURRENT OPERATING EXPENSES, not included above.

Advertising and sales promotion

Rent

Insurance

Taxes (except wage or income)

Telephone and telegraph

Business and professional services (legal, acc't.)

Regional Input-Output Study
 Department of Regional Science
 University of Pennsylvania
 Philadelphia, Pennsylvania

Preliminary Draft
 May, 1966

Chapter 8

Finance, Insurance, and Real Estate

FINANCE

INTRODUCTION

Six finance sectors were defined within the Regional Input-Output Study. The sectors were based upon the Standard Industrial Classification system, but also reflect the major institutional breakdowns within the region and the availability of secondary data. The sector definitions and codes are shown in Table 8-1. All six finance sectors are aggregated within sector 70 of the OBE study. There exist significant differences in definitions of output between this regional study and the 1958 OBE interindustry study for the U.S.⁽¹⁾

Table 8 - 1

Sector Definitions and Codes

Regional Input-Output Study

Sector	Title	SIC
6011	Federal Reserve Bank	6011
6020	Commercial & Stock Savings Banks	602
6030	Mutual Savings Banks	603
6120	Savings & Loan Associations	612
6190	Miscellaneous Financial Institutions not elsewhere classified	604, 605, 611, 613, 614, 615, 616, 67
6200	Security & Commodity Brokers, Dealers Exchanges, and Services	62

⁽¹⁾Office of Business Economics, "Industry Description Appendix I to Input-Output Study - 1958" U.S. Department of Commerce, November, 1964.

Table 8-2 shows the estimated regional output and sample coverage for the financial sectors.

Table 8-2

SAMPLE COVERAGE

Sector	Regional Output (\$)	Sample Output (\$)	Percent Coverage
6011	8,134,000	8,134,000	100.0
6020	313,821,000	246,454,200 ⁽¹⁾	78.5 ⁽¹⁾
6030	144,230,000	75,736,200	52.5
6120	1,369,000	1,369,000 ⁽²⁾	100.0 ⁽²⁾
6190	94,268,000	(3)	(3)
6200	<u>62,068,000</u>	<u>17,432,646</u>	<u>28.1</u>
TOTAL	\$623,890,000	\$349,126,046	56.0%

(1) Based on special tabulations of reports by the 3rd Federal Reserve Bank. Special survey to augment the Federal Reserve Bank tabulation covered 55.0% of the regional output.

(2) Based on FHLBB published data. Special survey to augment the FHLBB data covered 24.9% of the regional output.

(3) Statistical sector, no sample data obtained.

Federal Reserve Bank (Sector 6011)

The Third Federal Reserve District Bank is located in Philadelphia. The value of output of the bank was defined in terms of the total current operating expenditures, less Federal Reserve currency expenses. Although the service area of the bank encompassed more than two-thirds of the Commonwealth of Pennsylvania, the entire State of Delaware, and nine counties in New Jersey, the total output of banking services are considered to be produced within the Philadelphia SMSA. The total operating expenditures for the bank during 1959 were \$8,131,200.

It should be noted that the level of output of this sector is relatively independent of other activity levels within the economy, or the actual income accruing to the Federal Reserve District Bank. The expenditures represent only approximately 17.3% of the total income, the residual being transferred to the U.S. Treasury each year. In 1959 this residual represented approximately \$42,227,000.

The development of the technical coefficients was based upon primary data available from the Federal Reserve Bank.

Commercial and Stock Savings Banks (sector 6020)

Ninety-nine enterprises within the Philadelphia SMSA were identified within sector 6020. The multiple branch banking operations and the lack of branch bank operating data made it necessary, for the purposes of the study, to consider the central office of the enterprise to be the focus of all banking activity.

The output of this banking sector (6020) was defined as the total annual operating earnings. The regional value of output was estimated from the annual "report of Earnings and Dividends"⁽¹⁾ filed with the Federal Reserve Bank by all member banks. A tabulation of the report was prepared by the research staff of the Federal Reserve Bank providing the required information by asset size of bank. The nineteen non-member banks within the Philadelphia SMSA were assigned, in accordance with the asset data available ⁽²⁾, to the four size classes; and the outputs based on FRB reports of each of these classes was increased accordingly.

(1) "Report of Earnings and Dividends - Calendar Year 1959" Federal Reserve Bank Form F.R. 107, Revised October 1957 and "Instructions for the Preparation of Reports of Income and Dividends by Member Banks of the Federal Reserve System."

(2) Polk's Bank Directory, (Nashville: R. L. Polk Company, 1962).

The preliminary tabulations indicated that 28.8% of the reported current operating expenditures were classified in a residual entry entitled "Other Current Operating Expenses." A special commercial banking questionnaire was developed to permit the disaggregation of this account.⁽¹⁾ This questionnaire requested the breakdown of the residual account into twenty or more segments reflecting the RIS sectors. The questionnaires were mailed with introductory material to the presidents of twenty-four major federal reserve member commercial banks within the study region. Eleven banks responded with excellent detail, in many cases listing ten or more additional items; one bank returned a partially completed questionnaire. The overall response rate was 50%. The sector coverage with respect to dollar value of output was 78.5% for the general data, and 55.0% for the detailed information on the single residual account.

The technical coefficients were calculated in the standard manner previously described; that is, the appropriate expenditure value for each designated sector was divided by the total value of output.

Mutual Savings Banks (Sector 6030)

Mutual savings banks (savings banks operating on a mutual basis without capital stock) are primarily located within the Northeastern United States. Within the Philadelphia SMSA, it was estimated from the County Business Pattern data that they employed approximately 1,394 persons in 1959.⁽²⁾

(1) Facsimile of the special Commercial Banking questionnaire may be found in the Appendix to this Chapter on p. 8-13.

(2) See 1959 Philadelphia SMSA Employment by Industry (Economic Division G) County Business Patterns, RIS Memorandum, August 1965.

Information available from the Regional Economic Survey of the Penn Jersey Transportation Study provided adequate detail for these banks covering 52.5 percent of total sector employment. The Penn Jersey study was the sole source of data for the development of the sector. The value of output, defined as total current operating earnings, was estimated by multiplying the sample output per employee by the total estimated regional employment in the sector. The technical coefficients were developed in the standard manner previously described on the basis of a sample of four enterprises.

Savings and Loan Associations (Sector 6120)

Two hundred fifty seven savings and loan associations were reported within the Philadelphia SMSA. The value of output of this sector, defined as total current operating income, was estimated to be \$1,369,111. This estimate was based on regional tabulations by the Federal Home Loan Bank Board.⁽¹⁾ The basis data for this sector were obtained in a two-fold process similar to that used in the commercial banking sector. With the use of the data reported on twelve accounts from the Federal Home Loan Bank Board, tabulated for the Philadelphia SMSA, it was possible to develop aggregate categories of expenditures. These were disaggregated based upon a special questionnaire distributed to twelve major associations within the region. The coverage of this detailed questionnaire represented approximately 24.9 percent of the estimated sector output within the region. Technical coefficients were developed in the standard manner, being based on the published data and the special questionnaires.

Miscellaneous Financial Institutions not elsewhere classified (Sector 6190)

This aggregate sector was defined, to include the many relatively

(1) Federal Home Loan Bank Board, Combined Financial Statements: 1960 (Washington: _____, 1961) Table 23, pp. 162-3. The 1960 data were used since 1960 was the first year for which statistical information was available at the metropolitan area level, and since there was no firm basis upon which to make an adjustment to 1959 levels for the study region.

small financial sectors within the region, including trust companies; foreign exchanges and banks; currency exchanges; safe deposit companies; clearing houses; rediscount institutions; agricultural, personal, and business credit institutions; loan correspondents and brokers; and all holding and investment companies. Inadequate regional data and the diversity of activities required the development of the aggregate sector as a statistical sector.

The value of output of the sector was defined, consistent with the other financial sectors, as the total current operating income. The regional output was estimated to be \$94,268,000. This estimate was derived by multiplying the total number of employees in the sector⁽¹⁾ by the wages per employee value derived from County Business Patterns, 1959.⁽²⁾ This total payroll value was then multiplied by an estimated output per wage dollar to obtain the sector output estimate. The ratio of total output to wage and salary payments was derived with the use of the sample data from sectors 6020, 6030, and 6120.

Security and Commodity Brokers, Dealers, Exchanges and Services
(Sector 6200)

This sector is defined as SIC major group 62; that is, those establishments engaged in the underwriting, purchase, sale, or brokerage of securities and other financial contracts on their own account or for the account of others; exchanges, exchange clearing houses, and other services allied with the exchange of securities and commodities.

(1) 1959 Philadelphia SMSA Employment by Industry (Economic Division G) County Business Patterns, RIS Memorandum, August 1965.

(2) U.S. Bureau of the Census and U.S. Bureau of Old-Age and Survivors Insurance, County Business Patterns, First-Quarter 1959, Parts 3A, 3B, Middle Atlantic States (Washington: U.S. Government Printing Office, 1961).

The value of output of the sector was defined as the total operating revenues, excluding the net capital gains of securities and commodities on the "house account." The output was estimated by multiplying the total estimated regional sector employment⁽¹⁾ by the ratio of output per employee derived from the sample.

A special mail questionnaire was developed for this sector. Twenty-eight questionnaires were sent out to a sample of regional firms; nine completed returns were received (32.1% response rate).

The technical coefficients were developed in the standard manner on the basis of the nine special questionnaires obtained in the sample survey and two returns from the Penn Jersey Transportation Study. Additional information was obtained from the annual reports of selected firms in the industry and the data of the Internal Revenue Service.⁽²⁾

INSURANCE

Two insurance sectors were developed within the Philadelphia regional economy. These reflected the major division of the industry into life insurance carriers and non-life insurance carriers. Those carriers engaged in non-life insurance activities include accident, hospital, and health insurance; fire marine, and casualty insurance; surety, title, and other underwriters of insurance. The sector definitions and codes are shown in Table 8-3. Table 8-4 gives sector outputs and sample coverage.

(1) 1959 Philadelphia SMSA Employment by Industry (Economic Division G) County Business Patterns, RIS Memorandum, August 1965.

(2) Internal Revenue Service, Source Book of Statistics of Income, 1959-60, Washington: U.S. Department of Treasury (microfilm) Industry 651, p. 59-265.

Table 8 - 3

Sector Definitions and Codes

Regional Input-Output Study

Sector	Title	SIC
6301	Non-Life Insurance Carriers	632 pt. 633, 635, 639
6310	Life Insurance Carriers	631, 632 pt.

Table 8 - 4

Sector	Regional		Sector Output and Sample Coverage		Percent Coverage	
	Firms	Output (\$000)	Firms	Output (\$000)	Firms %	Output %
6301	43	117,786	6	93,739	13.9	79.6
6310	87	802,525	5	516,688	5.7	64.4

Life Insurance Carriers (Sector 6310)

The value of output of the life insurance sector is defined as the total of operating and underwriting costs inclusive of profits. This was estimated in the Philadelphia region to be approximately \$117,786,000. This estimated output was obtained by multiplying (1) the ratio of total underwriting and operating costs (inclusive of profits)⁽¹⁾ in the sample to total premiums earned by (2) the value of total premiums earned by sector firms within the SMSA as reported by the State Insurance Commissioners.⁽²⁾ This procedure involved the assumption that there exists an industry-wide relationship between premiums earned and the total underwriting and operating costs in the same year. The location of insurance carriers

(1) The profit rates for the sample were obtained from industry data of the Internal Revenue Service.

(2) "Report of the Insurance Commissioner of the Commonwealth of Pennsylvania for the period June 1, 1959 to May 31, 1960." (Harrisburg: Pennsylvania Insurance Department, 1960).

with respect to the region was made on the basis of the site of the main administrative offices.

The total output of the sample was obtained by summing the reported current operating and underwriting expenses and imputing to that sum an appropriate profit.⁽¹⁾

A special questionnaire was developed to obtain primary data from the major insurance carriers within the region.⁽²⁾ Although each of the companies operating within the region is required to file an annual financial report with the appropriate state insurance department, these reports provided insufficient detail on the materials and services purchased.

Six major life insurance firms were selected from the 43 firms within the region. All selected firms responded, providing a coverage of \$93,739,146 or 72.1 percent of the total output. The technical coefficients were developed in the standard manner; an imputed profit value of 5.69% was based on the IRS data.

Non-Life Insurance Carriers (Sector 6301)

The value of output of the non-life insurance sector is defined as the total premiums earned by the carriers within the study region. This output estimate was based upon the reports filed by the carriers with the State Insurance Department.⁽³⁾

Five of the 87 largest non-life insurance carriers were interviewed using the special insurance questionnaire. The data obtained provided significantly greater detail than the data available from the annual financial reports filed with the State insurance departments. Four of the five carriers responded with detail exceeding that initially requested.

⁽¹⁾ Internal Revenue Service, Op. Cit. Industries 662 and 669.

⁽²⁾ Facsimile of the special questionnaire is in the Appendix, pp. 8-17-18.

⁽³⁾ Pennsylvania Insurance Department, Op. Cit.

The sample coverage was \$516,687,755 or 64.4% of total sector output. Technical coefficients were developed in the standard manner.

Real Estate, Insurance, and Combination Agents (Sector 6590)

This sector was defined to include those agent operations not elsewhere classified. Specifically it includes: Insurance agents, brokers, and service (SIC 6411); Real estate operators and lessors (SIC 651); Real estate agents, brokers, and managers (SIC 653); and combinations of real estate, insurance, loans, and law offices (not classifiable on the basis of predominant nature of business) SIC 6611).

The value of output of the sector was defined as the total annual revenue (excluding personal financial earnings). The sector output was estimated by multiplying the estimated total regional employment within the sector ⁽¹⁾ by the sample output per employee.

Since there is a wide diversity of enterprises within the sector, various procedures were utilized to verify the estimated sector output. In general, reasonable consistency was found in the use of output per employee ratios as calculated from the sample data gathered by the study, the data of the Penn Jersey Transportation Study, and payroll per employee data derived from County Business Pattern publications.⁽²⁾

(1) 1959 Philadelphia SISA Employment by Industry (Economic Division G) County Business Patterns, RIS Memorandum August 1965.

(2) U.S. Bureau of the Census and U.S. Bureau of Old Age and Survivors Insurance. Op Cit.

The primary data were obtained from 18 returns of the Penn Jersey Transportation Study covering 31¹/₂ employees and the limited survey by RIS providing 10 returns covering 7¹/₂ employees. Intotal the survey data represented a coverage of approximately 2.1% of the estimated total sector employment. The technical coefficients were developed from the survey data in the standard manner.

APPENDIX

Chapter 8

Finance, Insurance, and Real Estate

Questionnaire: Commercial Banking	8-13
Questionnaire: Savings and Loan Association	8-14
Questionnaire: Security & Commodity Brokers	8-15
Questionnaire: Insurance	8-17
Questionnaire: Agents	8-19

REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

COMMERCIAL BANKING INDUSTRY

To enable this study to identify the purchases of goods and services by the commercial banking industry from the other industries in the economy we have developed this special questionnaire. Reference is made to the REPORT OF EARNINGS AND DIVIDENDS - 1959, which all member banks filed with the Federal Reserve Bank of Philadelphia. Specifically these questions are an attempt to identify expenditures which were classified as "Other Current Operating Expenses", question 2-h. Estimates are acceptable where information is not easily available. (If any problems arise, please call Mr. Thomas W. Langford, 594-7737).

Total Current Operating Earnings	\$ _____
Other Current Operating Expenses	\$ _____
1. Rent (Real estate)	\$ _____
2. Rent (Equipment, etc.)	\$ _____
3. Telephone and Telegraph	\$ _____
4. Electricity	\$ _____
5. Gas/Oil/Steam (Please specify which)	\$ _____
6. Water	\$ _____
7. Postage	\$ _____
8. Fire, Casualty Insurance	\$ _____
9. Bonding and Surety Charges	\$ _____
10. Deposit Insurance Assessments	\$ _____
11. Clearinghouse Charges	\$ _____
12. Auditing Services	\$ _____
13. Legal Services	\$ _____
14. Advertising Services	\$ _____
15. Business forms (deposit slips, etc.)	\$ _____
16. Office Supplies	\$ _____
17. Janitorial and Cleaning Services	\$ _____
18. Office Equipment (minor)	\$ _____
19. Protection Services	\$ _____
20. Others (Please specify) _____	\$ _____
_____	\$ _____
_____	\$ _____

Thank You

SAVINGS AND LOAN ASSOCIATIONS

Regional Impact Study
Wharton School of Finance and Commerce
University of Pennsylvania

Thomas W. Langford, Jr.
594-7737

Please indicate dollar values for 1960 expenditures.

Total Operating Income

\$

Real estate

\$

Other

\$

Electricity

\$

Gas

\$

Oil

\$

Water

\$

Telephone and Telegraph

\$

Office Supplies

\$

Printing Services

\$

Maintenance Supplies

\$

Real estate taxes

\$

Other state and local taxes

\$

Federal Taxes

\$

\$

\$

\$

\$

REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

Security and Commodity, Brokers and Dealers
and Other Financial Services

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If the questionnaire is completed for any period other than the calendar year 1959, please indicate the period used _____

Please report information concerning all activities of your firm within the Philadelphia region.

The Philadelphia Standard Metropolitan Statistical Area (SMSA) is comprised of the counties of: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey as indicated on the attached map.

If any questions arise with regard to specific items in this questionnaire, please call:

Mr. Thomas W. Langford
Dept. of Regional Science
University of Pennsylvania
(215) 594-7737

Name of Firm: _____

Address: _____

Respondent: _____

A. Average Annual Employment _____

B. Total Operating Revenue \$ _____
(excluding financial earnings)

C. Goods/Services Purchased	Total Value of Purchases	Estimated Percentage Purchased within the Philadelphia Region
1. Real estate rent	\$ _____	_____ %
2. Communication equipment	_____	_____
3. Data processing equipment	_____	_____
4. Utilities: electricity	_____	_____
gas/oil	_____	_____
water	_____	_____
5. Telephone	_____	_____
6. Telegraph &/or other systems	_____	_____
7. Printing services	_____	_____
8. Office supplies	_____	_____
9. Postage	_____	_____
10. Advertising	_____	_____
11. Insurance (bonding, etc.)	_____	_____
12. Interest & banking charges	_____	_____
13. Payments to other brokers, dealers, etc.	_____	_____
14. Legal services	_____	_____
15. Auditing services	_____	_____
16. Other business services	_____	_____
17. Others (specify) _____	_____	_____
	_____	_____
	_____	_____
18. Wages & salaries	_____	_____
19. Pensions & other employee benefits	_____	_____
20. Federal taxes	_____	_____
21. State taxes	_____	_____
22. Local taxes	_____	_____

REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

INSURANCE INDUSTRY

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If the questionnaire is completed for any period other than the calendar year 1959, please indicate the period used.

Please report information concerning all insurance activities of the firm noted below:

If any questions arise with regard to specific items in this questionnaire, please call:

Mr. Thomas W. Langford, Jr.
Department of Regional Science
University of Pennsylvania
(215) 594-7737

-
- A. Average annual number of employees _____
- B. Total Annual Wages and Salaries \$ _____
- C. \$ _____
- D. Estimated proportion of the above premiums within the study area.
(See attached map). _____

E. Operating Expenses

1. Office Supplies	\$ _____
2. Manifold business forms	_____
3. Printing services	_____
4. Mailing services	_____
5. Postage	_____
6. Office equipment (purchase)	_____
7. Data processing equipment (purchase)	_____
8. Data processing equipment (rental)	_____
9. Real estate rental	_____
10. Electricity	_____
11. Oil/Gas/Steam	_____
12. Water	_____
13. Telephone, Telegraph	_____
14. Advertising	_____
15. Janitorial/Cleaning services	_____
16. Maintenance & repair expense	_____
17. Investment expenses	_____
18. Auditing services	_____
19. Legal services	_____
20. Registration & licensing fees	_____
21. Re-insurance premiums	_____
22. Agents fees or commission (non-wage)	_____
23. Local taxes	_____
24. State taxes	_____
25. Federal taxes	_____
26. Claims payments to policy holders	_____
27. Other payments to policy holders	_____
28. Medical services	_____
29. Rating bureau services	_____
30. Brokerage fees, etc.	_____
31. Employee benefit programs	_____
32. Others	_____

Thank you

Regional Impact Study
Wharton School of Finance and Commerce
University of Pennsylvania
Insurance and Real Estate Agents

8-19

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If the questionnaire is completed for any other period than the calendar year 1959, please indicate the period used

Please report information concerning all your activities within the Philadelphia region (the counties of Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey as indicated on the attached map). If any question arise, please do not hesitate to call Mr. Thomas W. Langford, 594-7737.

Name: _____

Address: _____

A. Average Annual Employment _____

B. Total Annual Wages and/or Salaries \$ _____

C. Annual Revenue (excluding personal financial earnings) \$ _____

D. Goods/Services Purchased	Total Value of Purchases	Estimated Percentage Purchased within the Philadelphia Region
-----------------------------	--------------------------	---

1. Rent (Real Estate)	\$ _____	_____ %
-----------------------	----------	---------

2. Office Supplies	_____	_____
--------------------	-------	-------

3. Utilities (Electricity)	_____	_____
----------------------------	-------	-------

Gas/Oil	_____	_____
---------	-------	-------

Water	_____	_____
-------	-------	-------

4. Telephone, Telegraph	_____	_____
-------------------------	-------	-------

5. Advertising: Agency	_____	_____
------------------------	-------	-------

Newspaper	_____	_____
-----------	-------	-------

Mail	_____	_____
------	-------	-------

Signs	_____	_____
-------	-------	-------

Other (specify) _____	_____	_____
-----------------------	-------	-------

6. Printing	_____	_____
-------------	-------	-------

7. Business: Legal	_____	_____
--------------------	-------	-------

Services	_____	_____
----------	-------	-------

Appraisal	_____	_____
-----------	-------	-------

Other (specify) _____	_____	_____
-----------------------	-------	-------

8. Brokerage Costs	_____	_____
--------------------	-------	-------

9. Credit References	_____	_____
----------------------	-------	-------

10. Collection Expense	_____	_____
------------------------	-------	-------

(2)

11. Title Search	\$		%
12. Association Dues and Fees			
13. Contributions			
14. Business Forms (manifold)			
15. Auto Expense: Gas/Oil			
Repair			
16. Postage			
17. Taxes: Federal			
State			
Local			
18. Insurance (including bonding)			
19. Other (please specify)			

THANK YOU

Regional Input-Output Study
Department of Regional Science
University of Pennsylvania
Philadelphia, Pennsylvania

Preliminary Draft
June, 1966

Chapter 9

General Services

INTRODUCTION

The General Service sectors have contributed significantly to the economic growth of metropolitan regions. These sectors have been providing an increasing quantity and variety of services to the people and businesses in the region. For the period 1958 to 1962 the sales of these sectors increased 34.2% while the number of establishments decreased by 3.1%. These sectors represented approximately 18.7% of the total value of gross output of the Philadelphia regional economy, in 1959.

Since there exists a very large number of establishments of small size and great diversity within the general service sectors, it was not possible, because of limited time and funds, to obtain the data necessary for the development of these sectors in a manner wholly comparable with other sectors of the study. The experience of the study, however, clearly indicates that the necessary data can be obtained, and that the methodology does exist for incorporating such data within the conceptual framework of a regional input-output study.

The value of output of the general service sectors, which were developed consistent with the OBE United States input-output study for 1958 (see Table 9-1), was defined as total earned business receipts. According to the Bureau of the Census definition these receipts include "...the total of all receipts from customers for services rendered during the year, whether or not payment was received during the year." Excluded from these receipts are investment dividends, real estate rental, and other similar non-business income. The receipts, however, do include "local and state sales taxes and Federal excise taxes collected by the establishments directly from the customers and paid directly by the establishment to a local, state or Federal tax agency." Unlike the definitions used by OBE, the RIS

Table 9-1

SECTOR CODES AND DEFINITIONS

Regional Input-output Study Sector Code	Sector Title	SIC Code	OBE Sector Code
7200	Hotels, Personal & Repair Services	70, 72, 76 (except 7694 & 7699)	72 (1)
7300	Business Services	6541, 72 (except 7391) 7694, 7699, 81, 89 (except 8921)	73
7500	Automobile Repair, Services, and Garages	75	75
7900	Amusement & Recrea- tional Services	78, 79	76

(1)

OBE sector 73 excludes establishments engaged in the redemption of merchandise coupons; these establishments were included within RIS sector 7300.

Table 9 - 2

ESTIMATED REGIONAL EMPLOYMENT AND OUTPUT

Sector	Employment	Output (\$000)
7200	39,390	350,567
7300	40,556	681,529
7500	7,297	122,749
7900	11,364	103,707
	<hr/>	<hr/>
TOTAL	98,607	1,258,552

sectors do not include as output the transferred secondary products of other sectors, but do include merchandise sales of the RIS service sectors, which OBE transferred to the trade sector.

The estimates of regional output for these sectors are shown in Table 9-2. A detailed account of the estimation procedures used for each sector follows.

PERSONAL SERVICE SECTOR (Sector 7200)

The value of output of Personal Services, was estimated by adjusting the 1958 Census data shown below.

Personal Services, Estimated Output
Philadelphia, SMSA

SIC	Census Reported Receipts (\$000)
701	53,737
703	3,901
72	214,822
762	28,414
763	3,721
764	9,235
769 (exc. 7694, 7699)	13,953
	<hr/>
	\$327,783

Since these data do not report Rooming and Boarding Houses (SIC 702) and Organization Hotels and Lodging Houses on a membership basis (SIC 704), a conservative estimate of the output of the omitted sectors of approximately \$5,500,000 was added to yield \$333,283,000 as the total output estimate of RIS sector 7200 for 1958. This sum was then multiplied by the average annual increase in regional personal income over the two year period 1958 to 1960, to yield an estimate of the 1959 output for this sector, as recorded in Table 9 - 2.

BUSINESS SERVICE SECTOR (Sector 7300)

The output of the Business Service sector was developed in a manner similar to that of Personal Services. The heterogeneity of the Business Service sector however required many estimates to be developed from non-Census sources. As noted in Table 9 - 1, the sector includes not only those establishments classified within SIC 73 (Business Services), but also: Title Abstract Companies (6541); repair services related to business, (Armature Rewinding Shops (7694) and Miscellaneous Repair and Related Services (7699); Legal Services (8111); and other miscellaneous services (89), including accountants, engineers, architects and other professional services. The output of each of the above segments of the sector were estimated separately.

Title Abstract Companies, (SIC 6541). The regional employment in this industry was estimated to be 240.⁽¹⁾ From the County Business Patterns data the average wage per employee was calculated

(1)

See Philadelphia SISA Employment (Economic Division H) County Business Patterns, RIS memorandum, August 1965.

to be \$3,170.83. On the basis of discussions with informed administrative personnel in the industry and other information, it was judged that wages and salaries constitute approximately 50 percent of total output; therefore the level of output was estimated at \$1,522,000.

Business Services (SIC 73, excluding 7391).⁽¹⁾ The estimate of regional output of this segment of the sector was based primarily upon Census data. The census reported employment in the Philadelphia SMSA in 1958 for SIC 73 (excluding 7391) was 17,598.⁽²⁾ This figure was considered to be much too low; and in its place an employment estimate of 26,172 was used, based on the adjusted County Business Pattern data.⁽³⁾ The value of \$14,071.03 receipts per employee was calculated from the regional Census data. This value was multiplied by the estimated employment to obtain \$368,267,000 as the estimated value of the regional output for this segment.

Repair Services (SIC 7694 and 7699). Selected repair services, namely armature rewinding shops (SIC 7694) and miscellaneous repair shops and related services, n.e.c. (SIC 7699), are included within the business service sector. The Census reported employment figure of 825 again appeared much too low on the basis of other sources of

(1)

This segment does not conform with the definition of OBE sector 73 for the 1958 U.S. interindustry study. The portions of SIC 7399 relating to the establishments engaged in the redemption of merchandise coupons was transferred by OBE to the trade sector, OBE 65. These establishments are included within RIS 7300.

(2)

U.S. Bureau of the Census, U.S. Census of Business: 1958, Selected Services, BC58-Sa30, New Jersey (Washington: U.S. Government Printing Office, 1960), p. 30-22.

(3)

1959 Philadelphia SMSA Employment by Industry (Economic Division H). County Business Patterns, RIS Memorandum, August 1965.

information. Therefore the adjusted County Business Pattern estimate of employment of 1,339⁽¹⁾ was used; it was multiplied by the Census receipts (output) per employee (\$14,546.67) to yield the regional estimate of the value of output of this segment of RIS sector 7300.

Legal Services (SIC 8111). The employment in this segment reported by County Business Patterns was approximately 4205.⁽²⁾ Since this figure primarily represented the employees of the large law firms the estimate of employment was increased to 8410 to account for the smaller private practices. Further, since reported wages and salaries (\$3,636.09 per employee) primarily represented secretaries and law clerks, estimated output per person was increased to \$11,058.27. These adjustments were made on the basis of several sources of secondary data and professional judgment.

Miscellaneous Services (SIC 89, excluding 8921). This segment is composed primarily of professional services relating to engineering and architecture; accounting, auditing and bookkeeping; and other miscellaneous services, such as writers, artists, commentators, weather forecasters, etc. County Business Pattern data indicated regional employment of approximately 9,107⁽³⁾. An average wage per employee of \$5,364.01 was also reported. An aggregate adjustment factor of 4.0 was used to account for the non-coverage of reported employment, the output of sole proprietorships and partnerships, and the relationship of wages to output in the industry. (i.e.

(1)

Ibid.

(2)

Ibid.

(3)

Ibid.

9,107 x \$5,364.01 x 4.0). Thus this segment's output was estimated at \$195,400,000.

The miscellaneous auxiliary and administrative employment reported by County Business Patterns, which was allocated to service sectors, was included within sector 7300. The employment figure was multiplied by an estimated output per employee of \$12,959.72 to yield the regional output of \$3,862,000.

The above segments were combined, as indicated in Table 9 - 3 to yield the total dollar estimate of the regional output of the business service sector.

Table 9 - 3

Business Service Sector 7300

Output Estimates, by Segment

SIC	Output (\$000)
6541	1,522
7300 (excluding 7391)	368,267
7694 & 7699	19,478
8111	93,000
89 (excluding 8921)	195,400
Others	3,862
TOTAL	681,529

AUTOMOBILE REPAIR, AUTOMOBILE SERVICES, AND GARAGES, (Sector 7500)

The output of the Automobile repair, automobile service, and garages, sector 7500 was developed from Census reported receipts.⁽¹⁾

(1)

U.S. Bureau of the Census, U.S. Census of Business: 1958, Selected Services, EC58-SA30, New Jersey (Washington: U.S. Government Printing Office, 1960)

To reflect 1959 levels of activity the 1958 total regional receipts (output) was multiplied by the average annual change in regional personal income in the Philadelphia region, 1958-1960.

AMUSEMENTS, (Sector 7900)

As with sector 7500, the output of the Amusement sector was developed from Census reported receipts. The difference between employment reported by Census (7,972) for the work week ending nearest November 15, 1959 and the adjusted County Business Pattern data (11,364) was considered to be primarily due to the highly seasonal nature of the industry. The output estimate was adjusted to reflect 1959 levels of activity by multiplying the 1958 Census reported receipts by the average annual change in reported personal income 1958-1960 in the Philadelphia region.

TECHNICAL COEFFICIENTS

Lack of time and funds precluded the collection of detailed primary data for these sectors. The coefficients of the general service sectors were taken directly from the 1958 OBE interindustry study for the United States. Although there are differences between the national and regional mix of industries within the sectors (as Table 9 - 4 indicates for sectors 7500 and 7900), it was not possible to make substantive adjustments of the OBE data.

The development of the RIS sector input structures was based on a disaggregation of the 1958 OBE interindustry coefficients with the use of limited secondary data and staff judgment. (1) In general the

(1)

Procedures used were similar to those used in the development of sectors 0708 and 0809, see Chapter 1, pp. 8-11.

procedure was to examine each of the RIS sectors included within each OBE input sector for logical significant inputs to a given producing sector. The relevant RIS sectors included within an aggregate OBE input were considered to contribute in proportion to their regional output provided there did not exist reasonable evidence to the contrary.

Table 9 - 5 presents the relevant coefficients for the Business Service sector (RIS 7300). Columns 1 and 2 show the OBE sector (1) code and input coefficients, as published. Column 3 indicates those RIS sectors which are contained within any given OBE sector and which were judged to contribute significantly to the sector.

Table 9 - 4

RELATIVE INDUSTRIAL MIX

U.S. and Philadelphia Region

Amusements, (Sector 7900)

SIC	United States		Philadelphia SMSA	
	(\$000)	%	(\$000)	%
781	1,085,369	24.2	15,323	15.7
782	163,648	3.7	2,787	2.8
783	1,171,783	26.1	26,864	27.5
791	125,108	2.8	2,511	2.6
792	472,019	10.5	12,261	12.5
793	505,442	11.3	7,269	7.4
794	958,507	21.4	30,752	31.5
TOTAL	4,481,876	100.0	97,767	100.0

(1)

_____, "The Transactions Table of the 1958 Input-Output Study and the Revised Direct and Total Requirements Data" Survey of Current Business, Vol. 45, No. 9, (September 1965) p. 40.

Automobile Repair & Service (Sector 7500)

SIC	United States		Philadelphia	
	Receipts (\$000)	%	Receipts (\$000)	SMSA %
751	578,035	15.0	25,625	22.3
752	366,096	9.5	12,563	10.9
753	2,758,660	71.6	72,611	63.3
754	150,182	3.9	3,972	3.5
<hr/>				
TOTAL	3,852,973	100.0	114,771	100.0
<hr/>				

All data based upon U.S. Census of Business: 1958.

Column 4 indicates for any given OBE input sector the relative proportion accounted for by the constituent RIS sectors. In general these proportions were based upon regional or national output ratios. The final column (5) represents the relevant RIS sector input coefficients.

Table 9 -5

National and Derived Regional Input Coefficients
BUSINESS SERVICES
RIS Sector 7300

Sector (1)	<u>1958 OBE National</u> Coefficient (2)	RIS Sector (3)	Disaggregate Proportion (4)	Adjusted Coefficient (5)
7	.001230	1100	-	.001230
12	.000900	1509	-	.000900
17	.000570	2271	.508997	.000290
		2272	.317625	.000181
		2279	.040336	.000023
		2295	.002596	.000001
		2298	.048385	.000028
		2299	.082061	.000047
18	.000180	2311	.750834	.000135
		2328	.033574	.000006
		2335	.195164	.000035
		2381	.001331	-
		2385	.002989	.000001
		2389	.015765	.000003
		3992	.000343	-
19	.000890	2391	.413131	.000368
		2393	.136053	.000121
		2394	.121171	.000108
		2399	.329645	.000293
24	.002690	2621	.385075	.001035
		2631	.211874	.000570
		2641	.135741	.000365
		2642	.027862	.000075
		2643	.065156	.000175
		2644	.003573	.000010
		2645	.017118	.000046
		2649	.147429	.000397
		2661	.006174	.000017
25	.000330	2651	.235879	.000078
		2652	.078332	.000026
		2653	.556079	.000183
		2654	.085283	.000028
		2655	.044427	.000015
26	.223310	2711	.032626	.007286
		2721	.029859	.006668
		2731	.099697	.022263
		2732	.041688	.009309
		2741	.010157	.002268
		2751	.193732	.043262

Sector (1)	<u>1958 OBE National</u> Coefficient (2)	RIS Sector (3)	Disaggregate Proportion (4)	Adjusted Coefficient (5)
		2752	.147250	.032882
		2753	.014488	.003235
		2761	.354964	.079268
		2782	.026272	.005867
		2789	.023320	.005208
		2793	.025947	.005794
27	.000560	2818	.144894	.000081
		2819	.676557	.000379
		2861	.000278	-
		2891	.055221	.000031
		2899	.123050	.000069
29	.001140	2841	.620511	.000707
		2842	.214721	.000245
		2843	.124849	.000142
		2844	.039919	.000046
31	.004440	2911	.964409	.004282
		2992	.035591	.000158
32	.002680	3011	.637775	.001709
		3069	.212619	.000570
		3079	.149606	.000401
34	.000020	3199	-	.000020
36	.000010	3299	-	.000010
38	.000640	3331	.008059	.000005
		3333	.000646	-
		3334	.023359	.000015
		3339	.006718	.000004
		3341	.352883	.000226
		3351	.091079	.000058
		3352	.027767	.000018
		3356	.148272	.000095
		3357	.038763	.000025
		3361	.181869	.000116
		3362	.047867	.000031
		3369	.067121	.000043
		3392	.005597	.000004
42	.000030	3423	.126362	.000004
		3429	.163359	.000005
		3479	.055321	.000002
		3481	.183639	.000005
		3494	.337904	.000010
		3496	.027286	.000001
		3497	.033607	.000001
		3499	.072522	.000002
43	.004190	3511	-	.004190

Table 9 -5
Continued

9-13

Sector (1)	1958 OBE National Coefficient (2)	RIS Sector (3)	Disaggregate Proportion (4)	Adjusted Coefficient (5)
44	.005550	3522	-	.005550
45	.000730	3531	-	.000730
47	.000750	3541	.200588	.000150
		3542	.048317	.000036
		3544	.684152	.000514
		3545	.046728	.000035
		3548	.020215	.000015
50	.000020	3591	.704952	.000014
		3599	.295048	.000006
51	.019650	3571	.889594	.017480
		3576	.027977	.000550
		3579	.082429	.001620
52	.003520	3581	.086309	.000304
		3582	.074154	.000261
		3584	.052967	.000186
		3585	.546127	.001922
		3586	.096254	.000339
		3589	.144189	.000508
53	.000005	3611	-	.000005
55	.000005	3641	-	.000005
58	.000190	3691	.817691	.000155
		3693	.080689	.000016
		3699	.101620	.000019
59	.000210	3711	.301586	.000063
		3714	.698414	.000147
61	.000750	3732	.459158	.000344
		3799	.540842	.000406
63	.007850	3831	.404010	.003171
		3851	.107573	.000844
		3861	.488417	.003835
64	.010130	3911	.059305	.000601
		3931	.093073	.000943
		3951	.085668	.000868
		3952	.032918	.000333
		3953	.039879	.000404
		3955	.048515	.000491
		3981	.083601	.000847
		3993	.247125	.002503
		3999	.309916	.003140

Sector (1)	1958 OBE National Coefficient (2)	RIS Sector (3)	Disaggregate Proportion (4)	Adjusted Coefficient (5)
65	.004610	9842	-	.004610
66	.025640	4811 4890	.805729 .194271	.020659 .004981
67	.062230	4832 4833	.325000 .675000	.020225 .042005
68	.010070	4911 4920 4941 4990	.623075 .286820 .079636 .010469	.006275 .002888 .000802 .000105
70	.012020	6020 6030 6120 6190 6200 6301 6590	- - - - - - -	.002610 .001200 .000011 .000784 .000516 .005956 .000943
71	.036630	6510	-	.036630
72	.004970	7200	-	.004970
73	.022430	7300	-	.022430
75	.004800	7500	-	.004800
76	.001350	7900	-	.001350
77	.000150	8061 8090 8211 8220 8290 8486	- - - - - -	.000022 .000030 .000033 .000042 .000002 .000021
78	.026880	9100	-	.026880
79	.000300	9200 9300	.500000 .500000	.000150 .000150
82	.010090	9826	-	.010090
69 81 VA	.484660	9888 9899	- -	.288944 .195716
TOTAL	1.000000			1.000000

Regional Input-Output Study
Department of Regional Science
University of Pennsylvania
Philadelphia, Pennsylvania

Preliminary Draft
June, 1966

Chapter 10

Service Sectors, not elsewhere covered

Research and Development, (Sector 7400)

The research and development activities within the Philadelphia SMSA which were carried out by private enterprise as the primary activity of specific establishments and as a secondary activity of educational institutions have been classified within RIS

(1) sector 7400. This sector includes the private establishments classified as commercial research, development, and testing laboratories (SIC 7391) and non-profit educational and scientific research agencies (SIC 8921).

The output of this sector is defined as the total value of research activities engaged in during the calendar year. For the private establishments, this is defined as the total annual business receipts; and for the non-profit establishments and educational institutions and output is defined as the total expenditures

(1) This sector is one of the few cases in the study where both the inputs and outputs of a secondary product have been transferred from the primary industry.

related to research and development. The output in the latter group is approximately equal to the amounts expended during the year on account of contracts and grants.

Although many have considered the research and development industry to be a "driving force"⁽¹⁾ in the economy, limited secondary data are available relating to the sector's value of output. A very large proportion of functional research and development activities are conducted as secondary operations of almost every major industry within the economy. However, this study almost without exception included output of secondary products as part of the total output of each industry (classified by primary product). Thus, although there exists, for example, a major General Electric facility within the region engaged in research and development on missiles and space vehicles, the facility was not included in RIS 7400. This establishment was assigned to sector RIS 3729, Aircraft Parts and Equipment, not elsewhere classified.

Estimate of Dollar Value of Output

Employment estimates were based upon adjusted data from County Business Patterns. These estimates for SICs 7391 and 8921 should be regarded as minimum estimates. They record 1,284 employees within 95 establishments with an annual payroll of approximately \$5.9 million (or \$4,595 per employee). A sample of six

⁽¹⁾ See Elizabeth Dauterman, "Economic Development: Technical Report No. 13, Community Renewal Project, Philadelphia, December 1964," _____, "The Innovation Industry, Business Review, Federal Reserve Bank of Philadelphia, August 1965, and Greater Philadelphia Movement, "How Institutions of Higher Education Contribute to the General Economic, Social and Cultural Betterment of Greater Philadelphia, " _____ January 1966.

research firms from a study by the Southeastern Pennsylvania Economic Development Corporation⁽¹⁾ (SPEDCO) indicates that within the region the value of research contracts per employee was approximately \$8,440. This value multiplied by estimated number of employee yields an estimated output for two segments of the sector of \$10,837,000.

The SPEDCO study also provided an estimate of the research activities undertaken by the educational institutions within the region. Adjustment of the 1964 data for non-reporting institutions and to a 1959 base yielded an estimate of \$31,188,000 for the value of research and development undertaken by the educational institutions. The total sector output was therefore estimated as \$42,025,000.

Technical Coefficients

In the absence of adequate secondary data relating to the operations of private research and development activities and the dominance within this region of research and development by educational institutions the input data were derived from the detailed accounting records of three institutions of higher education. These data were obtained from accounts specifically having reference to "organized research." Appropriate adjustment was made to account for profits of the private firms within the sector. On the basis of selected published reports of major firms within the sector (not all of which were located within the Philadelphia region) profits were estimated at 3% of private (non-educational) output.

(1) _____, Southeastern Pennsylvania: A Spectrum of Opportunity (Philadelphia: Southeastern Pennsylvania Economic Development Corporation, 1965), including separate section entitled "Research in Southeastern Pennsylvania."

MEDICAL

HOSPITALS (Sector 8061)

The hospital sector includes all private, general and specialty hospitals, clinics, or dispensaries which are classified within SIC 8061. Hospitals operated by governmental agencies are classified within the government sectors, in particular RIS 9201 (State Public Health and Welfare Institutions), 9105 (Veterans Administration Institutions) and, 9122 (U.S. Military Hospitals).

The output of the hospital sector is defined as the total current operating expenditures of the 108 establishments within the sector. The value of output was estimated with use of the data on total expenditures published by the American Hospital Association for 1962.⁽¹⁾ These data were adjusted to 1959 levels on the basis of estimated employment changes 1959-1962.⁽²⁾

The technical coefficients were developed from primary data available from other related research studies.⁽³⁾ The sample coverage was approximately 12.9% of the total regional output.

⁽¹⁾ American Hospital Association, "Hospitals" Journal of the American Hospital Association, Volume 37, No. 15. (August 1, 1963).

⁽²⁾ 1959 Philadelphia SMAA Employment by Industry (Economic Division H) County Business Patterns RIS Memorandum, August 1965 and Alderson Associates, Inc., Philadelphia-South Jersey Metropolitan Area Hospital Study, Vol. I and II. (Philadelphia: Hospital Survey Committee, 1961).

⁽³⁾ See: Robert E. Coughlin and Walter Isard, Planning Efficient Hospitals Systems RSRI Discussion Paper No. 1. (Philadelphia: Regional Science Research Institute, 1963); Robert E. Coughlin, Walter Isard, and Jerry B. Schneider, The Activity Structure and Transportation Requirements of a Major University Hospital, RSRI Discussion Paper No. 4 (Philadelphia, Regional Science Research Institute, 1964); and, Robert E. Coughlin, Hospital Complex Analysis: An Approach to Analysis for Planning a Metropolitan System of Service Facilities. University of Pennsylvania, unpublished Ph.D. dissertation, 1964.

Medical and Health Services, not elsewhere classified, (Sector 8090)

This sector includes all medical and health services except hospitals, (classified in sector 8061). It includes physicians and surgeons; dentists and dental surgeons; osteopathic physicians; chiropractors; medical and dental laboratories; sanatoria, convalescent and rest homes; veterinarians and animal hospitals; and other health and allied services, not elsewhere classified. ⁽¹⁾

The value of output of this sector was defined as the total of professional fees received for services rendered. The estimation of the output within the region was limited by the almost complete absence of secondary data. County Business Patterns ⁽²⁾ indicated the regional employment within this sector to be approximately 11,933 (including the estimated 323 employees in SIC 0721). This figure was judged low in view of the listing of approximately 8294 medical doctors within the 5 Pennsylvania Counties of the SMHA by the American Medical Association. ⁽³⁾ The CBP employment figure was used nevertheless.

Sample data obtained by Penn Jersey Transportation Study concerning medical laboratories, and sample data regarding physicians, surgeons, dentists, et. al. obtained by the RIS staff suggested an output per employee of approximately \$22,211.76. This output appears reasonable in the light of additional data relating to the average annual wages and the proportion of total expenditures of medical doctors accounted for by wages and salaries. ⁽⁴⁾

⁽¹⁾ The sector includes SIC major group 80 (except 8061) and 0721.

⁽²⁾ 1959 Philadelphia SMCA Employment by Industry (Economic Division

⁽³⁾ H) County Business Patterns, RIS Memorandum, August 1965.

⁽⁴⁾ American Medical Association, American Medical Directory, 23rd Edition, (Chicago: _____, 1965).

_____, "Physicians' Economic Health: Excellent" Medical Economics, December 13, 1965, Medical Economics, Inc. Oradell, N.J. pp. 75-127.

The technical coefficients for this sector were based upon limited survey information obtained by the Penn Jersey Transportation Study (four returns) and by the RIS staff (twenty-two returns). Using the standard survey techniques of personal interviewing previously described,⁽¹⁾ the response rate for this survey was 41.5%. The reported output of the 26 sample establishments was \$1,732,518 or 0.7 percent of the estimated regional output of the sector.

(1) See Facsimile copy of the interview forms in the Appendix to this Chapter, pp. 10-16 ff.

EDUCATION

The educational services within the Philadelphia region were developed in three sectors for this study. The following sectors developed within the Standard Industrial Classification system were used.

Table 10 - 1

Sector Codes and Definitions

Sector 8211, Elementary and Secondary Schools	SIC 8211
Sector 8220, Institutions of Higher Education	SIC 822
Sector 8290, Other Educational Institutions and Services, n.e.c.	SIC 823, 824 & 829

Because of difficulties, both conceptual and empirical, of estimating ~~the~~ value of output in terms of income or receipts the output value was estimated in terms of cost, that is, as the sum of current operating expenditures, not including those expenditures specifically designated as organized research and development (defined within RIS sector 7400).⁽¹⁾

Elementary and Secondary Schools (Sector 8211)

This sector includes all elementary and secondary schools below the college grade (usually grades kindergarten to 12), inclusive of both public and private schools. The regional estimate of current operating costs was based primarily upon a special tabulation of these costs prepared by the Penn Jersey Transportation Study for the 376 public school districts within the region.

⁽¹⁾ See: Research and Development, Sector 7400, pp. 10-1 - 10-3, Supra.

Direct expenditure data were not available for the private (denominational and sectarian) schools; however, they were estimated in aggregate to be approximately 35 percent of the public school values, based on limited enrollment data. Assuming that a slightly lower expenditure per pupil characterizes non-public schools, the total tabulated public school expenditures was increased 33%. The regional output of RIS sector 8211 was estimated to be \$353,108,000.

The technical coefficients for this sector were developed in two stages. Tabulations of reported data made available by the Penn Jersey Transportation Study provided initial breakdowns of the total public school expenditures by the following categories:

General
Instruction
Auxiliary Agencies
Operation of Plant
Maintenance of Plant
Fixed Charges
Debt Service & Interest
Cafeteria Fund

The allocation of expenditures for each of the categories to the appropriate RIS sectors was made on the basis of sub-accounts available from the same tabulations (especially in the New Jersey school districts) and extremely detailed accounts from the annual reports of two large school systems.⁽¹⁾ The two detailed reports represented approximately 28.3% of the total sector expenditures.

(1) _____, "Annual Report of the Secretary and Business Manager: 1959, School District of Philadelphia," The Board of Public Education, Philadelphia, Pennsylvania, and "Annual Report: 1959" The School District of the Township of Upper Darby, Delaware County, Pennsylvania.

Institutions of Higher Education (Sector 8220)

There are 46 institutions of higher education within the Philadelphia region (excluding three state-operated institutions classified in RIS sector 9202). The enrollment within these institutions was estimated to be approximately 71,990. ⁽¹⁾

The value of output of the sector was defined to be the total of current operating expenditures of the institutions excluding expenditures for organized research or development. ⁽²⁾ The value of output of the sector was estimated on the basis of expenditure per student using sample data and information obtained from a study of 21 institutions within Philadelphia. ⁽³⁾ The output (expenditures) per student (\$1,756) was multiplied by the number of students to yield sector output (\$126,416,000).

The technical coefficients for this educational sector were developed from highly detailed data obtained from the accounting records of three institutions within the region; the data were weighted to reflect the size composition of the institutions in the region. ⁽⁴⁾

⁽¹⁾ U.S. Office of Education, H.E.W., Education Directory: 1960-61, Part 3 Higher Education (Washington: U.S. Government Printing Office, 1961). Also see: Greater Philadelphia Movement, "How Institutions of Higher Education Contribute to the General Economic Social and Cultural Betterment of Greater Philadelphia, January 1966.

⁽²⁾ This was estimated to be approximately \$31,188,000 in 1959 and was included as output in RIS sector 7400, Research & Development.

⁽³⁾ Comprehensive Planning Division, "Economic Impact of Philadelphia's Institutions of Higher Education," Philadelphia City Planning Commission, May 1965. (draft)

⁽⁴⁾ Differences in broad expenditures patterns for size groups may be noted in the previously noted study by the Philadelphia City Planning Commission.

Expenditures of the three institutions accounted for approximately 71.4% of the total estimated expenditures. The resulting expenditure pattern appears to be representative of the sector in that it agrees reasonably well with the data available in the Philadelphia City Planning Commission study covering 21 institutions at the gross levels. (See Table 10-2)

Table 10 - 2

Comparison of Major Expenditure Classes

Type of Expenditure	21 Institutions (FCPC) 1960	RIS 1959
Payroll	.624612	.612091
Materials	.127317	.124142
Utilities	.027515	.026423
Others	<u>.220556</u>	<u>.237344</u>
Total	1.000000	1.000000

Source: Philadelphia City Planning Commission, Op. Cit., Table 5, p. 8 and the Regional Input-Output Study

Other Educational Institutions and Services, Not Elsewhere
Classified (Sector 8290)

This sector includes libraries, correspondence schools, vocational schools, and other non-degree granting schools, not elsewhere classified. (Beauty and barber schools are included in sector 7200). The value of output of the sector is defined by the total of current operating expenditures of the establishments within the sector.

Employment within the sector was estimated to be approximately 2,353 on the basis of adjusted County Business Pattern data. ⁽¹⁾

The total annual payroll was estimated from the same source to be

⁽¹⁾ 1959 Philadelphia SISA Employment by Industry (Economic Division
II) County Business Patterns, RIS Memorandum, August 1965.

\$8,419,000, or \$3,573 per employee. Multiplying the weighted average of output to payroll for the other two educational sectors by the estimated total sector payroll yields an estimate of sector value of output of \$13,150,000.

The pattern of expenditures for this sector was hypothesized to be similar to that for the other two educational sectors. Therefore the technical coefficients for the sector were derived as a weighted average of the technical coefficients previously determined for sectors 8211 and 8220.

Non-Profit Membership Organizations, Museums, Art Galleries, Arboreta, Botanical and Zoological Gardens (Sector 8486)

Sector 8486 is composed of a heterogeneous mix of organizations with significantly different expenditure patterns. The sector includes: business associations; professional membership organizations; labor unions and similar labor organizations; civic, social, and fraternal associations; political organizations; religious organizations; charitable organizations; and other non-profit membership organizations; as well as museums, art galleries, arboreta, botanical and zoological gardens. The value of the output of the sector was defined as total expenditures for the year.

Museums, Art Galleries, Arboreta, Botanical and Zoological Gardens

Employment estimates developed from County Business Patterns data⁽¹⁾ suggested the employment in SIC 84 (Museums, Art Galleries, Arboreta, Botanical, and Zoological Gardens) to be approximately

⁽¹⁾ 1959 Philadelphia SMSA Employment by Industry (Economic Division H) County Business Patterns, RIS Memorandum, August 1965.

712. Estimates from the same source indicated employment in charitable organizations (SIC 8671) to be approximately 4,070, and in the remaining portions of the sector to be approximately 18,555. The County Business Pattern data are inadequate and must be regarded as understatements; however, no other data were available with which to make appropriate adjustments.

The total annual payroll for SIC 84 developed from the CBP data was approximately \$2,573,000.⁽¹⁾ Sample data collected from two major establishments in SIC 84 in this area indicated the ratio of output (total expenditures) to payroll to be 1.332735. Multiplying this ratio by the estimated sector payroll yields a total output of \$3,429,000 for SIC 84 within RIS sector 8486.

Charitable Institutions

The value of output of Charitable Institutions (SIC 8671) was developed from a basic study by the Health and Welfare Council of Philadelphia, Inc.⁽²⁾ Expenditures by non-governmental units for the five Pennsylvania counties were estimated at \$37,292,444 as indicated in Table 10 - 3. These data for the 5 Pennsylvania counties were adjusted to reflect the three New Jersey counties within the SMSA on the basis of population. The resulting expenditure (output) for SIC 8671 was \$45,039,000.

⁽¹⁾ Ibid.

⁽²⁾ Daniel R. Fascione, 1959 Total Expenditure Study: A Study of Expenditures and Sources of Income for Health, Welfare and Recreation Services in the Five-County Area of Southeastern Pennsylvania Special Report Series No. 11, (Philadelphia: Health and Welfare Council, Inc., 1961).

Table 10 - 3

Charitable Organizational Expenditures: 1959
by General Area, 5 Southeastern Penna. Counties ⁽¹⁾

Item	Expenditures	
Recreational:		
YMCA, YWCA, YMHA, YWHA	\$2,917,814	
Boys' Clubs & Girls' Clubs	534,000	
Settlement & Community Centers	2,257,532	
Scouting	1,191,256	
Resident Camps	1,904,568	
Other Recreational Services	<u>492,241</u>	
Sub-total: Recreational		\$ 9,297,411
Welfare:		
Shelter for Transients & Homeless	707,168	
Homes for Aged	6,696,977	
Family Service & Child Care	12,345,972	
Maternity Home Care	147,009	
Specialized Services for Handi- capped	4,630,567	
Other Welfare	<u>1,180,796</u>	
Sub-total: Welfare		25,708,489
Central Services		<u>2,286,544</u>
TOTAL		\$37,292,444

Religious Organizations

The largest segment within the remainder of the sector was that of religious organizations. From this segment of the economy it was very difficult to extract reliable data. The major institutions without exception refused to cooperate with the study. On the basis of estimates by various members of the study staff and knowledgeable professionals within the industry this segment of the sector was estimated to range between \$125 million and \$300 million. In the absence of any data, ⁽²⁾ the

⁽¹⁾ Ibid. Tables 10, 15, and 20, pp. 12, 17 and 20 respectively.

⁽²⁾ A brief study completed by the Greater Philadelphia Council of Churches, Research Department (April 1965) concerning salaries of church employees, was examined, but not used due to the extremely poor coverage and biases.

output of this segment was set conservatively at \$175 million, subject to revision in the light of data which might be subsequently collected.

The value of output of \$5.5 million for non-profit membership organizations, excluding religious and charitable, was estimated on the basis of staff judgement and limited data available from newspapers and other diverse sources. Hence, the total value of output of sector 8486 was estimated at \$229,018,000 as shown in Table 10-4.

Table 10 - 4

Estimated Output of Sector 8486

Industry	Output (\$000)
SIC 84	3,429
8671	45,089
8661	175,000
86 (exc. 867, 866)	<u>5,500</u>
TOTAL (PIS Sector 8486)	\$229,018

The technical coefficients for this sector were developed from limited primary data and published secondary sources. The data for two major institutions which constituted 29.6% of the value of output of SIC 84 were used as representative of that segment of the sector. Data for charitable organizations were estimated in four parts, (Clubs⁽¹⁾; Scouting; Camps; and Welfare and Central Services) based upon secondary data and published annual reports. Data for religious organizations were estimated on the basis of one primary source (one moderately large urban church), and limited secondary data available from the Greater

⁽¹⁾Included: YMCA, YMHA, YWCA, YWHA, Boys' Clubs, Girls Clubs, and Settlement and Community Centers.

Philadelphia Council of Churches. These data were weighted so as to reflect the value output of the religious organization segment of the sector. Data for the remaining portions of the segment was estimated by staff judgement, and primarily reflect the "office Characteristics" of that segment of the sector.

Private Household Services, (Sector 8800)

This sector is comprised of labor which serves on or about the premises of private households in occupations usually considered domestic services. Individuals included in this sector are primarily cooks, maids, butlers, personal secretaries, gardeners, caretakers, chauffers, laundresses, etc. The household services of these workers are all classified within SIC 8811.

The value of output of this sector was defined as the total gross earnings of these employees for services rendered. An estimate of regional employment within the sector was provided by the staff of the Pennsylvania Bureau of Employment Security. Based upon the assumptions that the average hourly rate of the domestic service employees in 1959 was approximately \$1.50 per hour, and that these employees worked approximately twenty-five hours per week, 48 weeks a year, the estimated earnings for services rendered were set at \$106,200,000.

The development of the technical coefficients for this sector was based entirely upon staff judgement and discussions with local labor market analysts.

APPENDIX

CHAPTER 10

Service Sectors, not elsewhere covered

Questionnaire, Medical Services	10-17
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CONFIDENTIAL

Regional Impact Study

Wharton School of Finance and Commerce
University of Pennsylvania

Doctors, Dentists, and Medical Services other than Hospitals

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If the questionnaire is completed for any period other than the calendar year 1959, please indicate the period used _____.

Please report information concerning all your activities within the Philadelphia region (the counties of Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey as indicated on the attached map). If any questions arise, please do not hesitate to call Mr. Thomas W. Langford, 594-7737.

Name: _____

Address: _____

A. Average Annual Employment _____

B. Total Annual Wages and/or Salaries \$ _____

C. Annual Revenue (excluding personal financial earnings) \$ _____

D. Goods/Services Purchased	Total Value of Purchases	Estimated Percentage Purchased within the Philadelphia Region
-----------------------------	--------------------------	---

1. Rent (Real Estate)	\$ _____	_____ %
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2. Office Supplies	_____	_____
--------------------	-------	-------

3. Telephone, Telegraph	_____	_____
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4. Utilities: Electricity	_____	_____
---------------------------	-------	-------

Gas/oil	_____	_____
---------	-------	-------

Water	_____	_____
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5. Insurance	_____	_____
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(2)

	\$ _____	_____ %
6. Books and Periodicals	_____	_____
7. Profession- : Legal	_____	_____
al Services Accounting	_____	_____
Other (please specify)	_____	_____
8. Medical and/or Dental	_____	_____
Supplies (please specify	_____	_____
Individual items)	_____	_____
	_____	_____
9. Association Dues and Fees	_____	_____
10. Consulting Fees	_____	_____
11. Laboratory Fees	_____	_____
12. Hospital Fees	_____	_____
13. Automobile Expense: Gas	_____	_____
Oil	_____	_____
Repair	_____	_____
Other	_____	_____
14. Contributions	_____	_____
15. Taxes: Federal	_____	_____
State	_____	_____
Local	_____	_____
16. Other Expense (please specify)	_____	_____
	_____	_____

THANK YOU

Regional Input-Output Study
 Department of Regional Science
 University of Pennsylvania
 Philadelphia, Pennsylvania

Preliminary Draft
 June, 1966

Chapter 11

Local Governments

There exists a wide range of activities undertaken by the 347 local governmental units within the Philadelphia SMSA. The differences in the legal and functional responsibilities of the governments within the two states and in their taxation practices made extremely difficult an effective functional sectoring of their activities, although such a sectoring may be proven to be superior for some analytic uses of this study. Therefore local government has been developed in the three sectors listed in Table 11 - 1, based upon broad statutory definitions of the civil units.

Table 11 - 1

Sector Codes and Definitions

Sector Code	Title	Number
9301	Cities	9 ⁽¹⁾
9302	Boroughs & Townships	330
9303	Counties	8 ⁽¹⁾

Cities, (Sector 9301)

This sector is composed of the nine cities located within the

(1)

The City and County of Philadelphia are coterminous; all the functions of the County have been assumed by the City and are included in sector 9301.

Philadelphia SMSA; three are located in Pennsylvania and six in New Jersey. Total value of output for this sector was defined as the total current expenditures of the nine cities, less the expenditures for water utility operations ⁽¹⁾ by two cities in Pennsylvania, and less the school and special district taxes collected and transferred ⁽²⁾ by the cities in New Jersey to the State and other jurisdictions. The value of output was estimated to be \$261,934,175 as shown in Table 11 - 2 below.

Table 11 - 2

OUTPUT ESTIMATES

Local Government: Cities (Sector 9301)
Pennsylvania

City	Total Current Expenditure (\$)	Less Adjustment for Water Utilities (\$)	Adjusted Total (\$)	Percent of Total
Philadelphia	259,261,769	11,225,180	248,036,589	94.694
Coatesville	694,970	92,855	602,115	0.230
Chester	2,707,707	-	2,707,707	1.033
Sub-Total:Pa.	262,664,446	11,318,035	251,346,411	95.957

New Jersey

		Less Adjustment for Tax Transfers		
Beverly	202,037	100,000	94,020	0.036
Bordentown	427,581	203,305	224,276	0.086
Burlington	1,438,388	403,536	949,752	0.362
Camden	14,941,603	6,481,600	8,459,913	3.230
Gloucester	1,299,974	968,069	331,905	0.127
Woodbury	1,337,765	809,876	527,889	0.202
Sub-Total:N.J.	19,647,348	9,059,584	10,587,764	4.043
Total Expenditures: City			261,934,175	100.000

(1)

The operation of municipal water utilities is included in RIS sector 4941.

(2)

In New Jersey, municipalities perform the function of a collection agency for school, county and special district taxes. These taxes are then turned over to the appropriate agencies.

The data concerning the current expenditures of the cities in Pennsylvania were obtained from an annual report⁽¹⁾ of the Department of Internal Affairs. For the cities in New Jersey, the expenditure data were obtained from the Annual Report⁽²⁾ of the Division of Local Government. Both States require all incorporated municipalities to submit detailed financial reports annually; for each city the State publications aggregate the expenditure data within these individual reports by major municipal functions.

A highly disaggregated breakdown of the expenditures of the City of Philadelphia was obtained directly from the records of the Department of Finance. These expenditures were allocated to RIS sectors with the use of the accounting Manual of the City.

Since the expenditures of the City of Philadelphia constituted approximately 95% of the total output of the sector and comparably detailed data were not readily available for the remaining cities, the coefficients for sector 9301 were based solely upon the expenditures data of the City of Philadelphia without adjustment.

Townships and Boroughs, (Sector 9302)

This sector is composed of the 199 townships and 131 boroughs located within the Philadelphia, Pa.- N. J. SMSA. Townships in Pennsylvania are classified as first and second class, a statutory

(1)

Bureau of Municipal Affairs, Local Government Financial Statistics: 1959, (Harrisburg: Pennsylvania Department of Internal Affairs, 1961).

(2)

Division of Local Government, Twenty Second Annual Report: 1959 (Trenton: New Jersey Department of the Treasury, n.d.).

distinction historically based on population; there were 25 first class and 122 second class. Table 11 - 3 presents the number of townships and boroughs and their expenditures by county.

Total value of output of the sector was defined as the total current expenditures of the 330 townships and boroughs, less the school and special district taxes collected and transferred by those townships and boroughs in New Jersey as previously noted. In both states, the municipalities are required by statute to file a uniform annual financial report and with minor exceptions the breakdown of expenditures by governmental function were identical in the two states. The total expenditures and their breakdown by major function were obtained from the State publications ⁽¹⁾ and are shown in Table 11 - 4.

The composition of the total township expenditures for each of the major function was estimated on the basis of detailed reports by two sample townships. ⁽²⁾ These two townships accounted for 17.05% of the total output of townships. For each major function the allocation of the expenditures to RIS sectors was made on the basis of account titles, descriptions, and staff judgment. Once the coefficients for each major function were obtained, these were multiplied by total expenditure of all townships for that major function to yield a vector of estimated expenditures by RIS sector for townships.

(1)

Bureau of Municipal Affairs, (Pennsylvania) Op. Cit., and Division of Local Government (New Jersey) Op. Cit.

(2)

"Financial Report of the Township of Abington, Montgomery County, Pennsylvania: 1959" and "Financial Report of the Township of Upper Darby, Delaware County, Pennsylvania: 1959."

Table 11-3

OUTPUT ESTIMATES

LOCAL GOVERNMENT: TOWNSHIPS AND BOROUGHs (Sector 9302)

	Townships		Boroughs		Total	
	Number	Expenditures	Number	Expenditures	Number	Expenditures
Pennsylvania						
Bucks	31	3,194,857	22	2,597,136	53	5,791,993
Chester	57	1,553,872	15	1,846,842	72	3,400,714
Delaware	21	8,268,506	27	3,629,317	48	11,897,823
Montgomery	38	8,593,592	24	5,427,930	62	14,021,520
Philadelphia	0	-	0	-	0	-
Sub-Total: Pa.	147	21,610,927	88	12,501,233	235	35,112,160
New Jersey						
Burlington	31	4,460,802	6	684,708	37	5,145,510
Camden	8	2,923,016	27	4,137,865	35	7,060,881
Gloucester	13	1,707,231	10	1,587,595	23	3,294,826
Sub-Total: N.J.	52	9,171,049	43	6,410,168	95	15,581,217
TOTAL	199	\$30,781,976	131	\$19,911,401	330	\$50,693,377

Table 11 - 4

Expenditures by Governmental Function

Townships and Boroughs (Sector 9302)

Function	Townships	Boroughs	Total
General Government	\$ 4,278,337 13.90%	\$ 2,822,718 14.18%	\$ 7,101,055 14.01%
Public Safety	\$ 9,312,845 30.25%	\$ 5,411,526 27.18%	\$ 14,724,371 29.05%
Health, Welfare & Sanitation	\$ 5,137,828 16.69%	\$ 3,185,815 16.00%	\$ 8,323,643 16.42%
Highway, Streets & Lighting	\$ 7,928,380 25.76%	\$ 3,850,525 19.38%	\$ 11,788,905 23.26%
Parks and Recreation	\$ 1,209,245 3.93%	\$ 540,838 2.72%	\$ 1,750,133 3.45%
Libraries & Misc. Education	\$ 268,719 87%	253,924 1.28%	\$ 522,643 1.03%
Interest	\$ 622,299 2.02%	\$ 392,896 1.97%	\$ 1,015,195 2.00%
Utilities	\$ - 0.00%	\$ 2,606,116 13.09%	\$ 2,606,116 5.14%
Miscellaneous	\$ 2,024,323 6.58%	\$ 836,993 4.20%	\$ 2,861,316 5.64%
TOTAL	\$30,781,976 100.00%	\$19,911,401 100.00%	\$50,693,377 100.00%

The expenditures by major function for each of the 131 boroughs were
(1)
allocated to the RIS sectors on the basis of two sample boroughs.

The selected boroughs represented 7.7% of the total output accounted for by boroughs. Once the coefficients for each major function were obtained, they were multiplied by total expenditures of all boroughs for that major function to yield a vector of estimated expenditures by RIS sector for boroughs.

(1)

"Financial Report of the Borough of Downingtown, Chester County, Pennsylvania: 1959" and "Financial Report of the Borough of Norristown, Montgomery County, Pennsylvania: 1959."

Since within this metropolitan area the distinctions between townships and boroughs is primarily legal rather than functional, the two expenditure vectors (one for townships, the other for boroughs) were summed by RIS sector, to yield a single vector of expenditures and the technical coefficients for sector 9302 were accordingly calculated in the standard manner.

Counties, (Sector 9303)

Sector 9303 is composed of the seven counties within the Philadelphia, Pa.-N. J. SMSA; the city and county of Philadelphia are coterminous and are considered as a single unit classified within sector 9301. Total value of output for the sector was defined as the total current expenditures of the seven counties less payments by the three New Jersey counties to hospitals, and other health and welfare institutions operated by the State of New Jersey. ⁽¹⁾ The dollar value of output for this sector is presented in Table 11 - 5.

Data on county expenditures were obtained from the State publications ⁽²⁾ which summarized the annual financial reports of counties and presented them by major governmental function. The New Jersey expenditures were reorganized to correspond to those of Pennsylvania in order to standardize the differing functional breakdowns. Expenditures by uniform governmental function are presented in Table 11 - 6.

Detailed annual financial reports providing the composition of

(1)

The expenditures excluded represent payments by these three counties for services rendered by state institutions, such services are included in sector 9201 (State Health & Welfare Institutions).

(2)

Bureau of Municipal Affairs, (Pennsylvania) Op. Cit., and Division of Local Government, (New Jersey) Op. Cit.

Table 11 - 5

Output Estimates

Local Government: Counties (Sector 9303)

County	Total (\$)		Adjusted Total (\$)
Bucks	6,013,916		6,013,916
Chester	2,343,645		2,343,645
Delaware	6,567,577		6,567,577
Montgomery	4,640,000		4,640,000
Sub Total: Pa.	19,565,138		19,565,138
		Less Adjustment for Transfers (\$)	
Burlington	4,257,216	1,219,572	3,037,644
Camden	10,353,623	4,365,220	5,988,403
Gloucester	2,430,021	428,350	2,001,671
Sub Total: N.J.	17,040,860	6,013,142	11,027,718
Total County Expenditures			\$30,592,856

expenditures by each major governmental function were obtained for
(1)
the four Pennsylvania counties. On the basis of these reports
the composition by RIS sector of total county expenditures for
each major governmental function was estimated. The resulting
disaggregations were appropriately weighted and summed to obtain a
vector of the total expenditures of the seven counties by RIS
sector. Technical coefficients were calculated from the dollar
values of this vector in the standard manner.

(1)

"Annual Financial Reports: 1959" for the Counties of Bucks, Chester, Delaware, and Montgomery as filed with the Department of Internal Affairs, Harrisburg, Pennsylvania.

Table 11 - 6

Expenditures by Governmental Function

Counties (Sector 9303)

Function	Pennsylvania	New Jersey	Total
General Government	\$10,098,249 51.61%	\$2,239,372 20.31%	\$12,337,621 40.33%
Judicial	2,593,500 13.26%	1,541,007 13.97%	4,134,507 13.51%
Correctional	3,021,450 15.44%	618,656 5.61%	3,640,106 11.90%
Health & Welfare	1,139,049 5.82%	1,822,891 16.53%	2,961,940 9.68%
Highway	664,818 3.40%	2,785,156 25.26%	3,449,974 11.28%
Civil Defense	70,135 0.36%	25,265 0.23%	95,400 0.31%
Interest	422,620 2.16%	416,457 3.78%	839,077 2.74%
Other	1,555,317 7.95%	1,578,914 14.31%	3,134,231 10.25%
TOTAL	\$19,565,138 100.00%	\$11,027,718 100.00%	\$30,592,856 100.00%

Chapter 12

State Governments

Introduction

State governmental operations initially have been included within the structural matrix. The activities of the two State governments within the Philadelphia region (Commonwealth of Pennsylvania and State of New Jersey) were functionally defined to produce six relatively homogeneous sectors.

The value of output of State governmental sectors has been defined as the total annual current expenditures less transfer payments to other governmental units or individuals. The output of the Pennsylvania Liquor Control Board (Sector 9204) which operates as a wholesale-retail distributor of "packaged goods", has been defined as gross margin, that is total sales, less purchases for resale.

Table 12 - 1 indicates the sector employment and output magnitudes for the region by State.

State Institutions (Sectors 9201, 9202, 9203)

The twenty institutions maintained by the States of Pennsylvania and New Jersey within the Philadelphia, Pa.-N. J. SMSA were aggregated by type to provide three relatively homogeneous sectors. These are: Health and Welfare (9201), Public Instruction (9202), and Penal (9203).

Table 12-1
STATE GOVERNMENTAL SECTORS
EMPLOYMENT & OUTPUT ESTIMATES

Sector	Title	Pennsylvania Employ- ment	Pennsylvania Output (\$)	New Jersey Employ- ment	New Jersey Output (\$)	Total SMSA Employ- ment	Total SMSA Output (\$)
9201	Health & Welfare Institutions	5,990	37,730,142	1,413	6,710,371	7,403	44,440,514
9202	Educational Institutions	534	5,047,652	168	1,360,343	702	6,407,995
9203	Penal Institutions	524	4,768,949	200	1,396,321	724	6,165,270
9204	Penna. Liquor Control Board	1,300	29,724,664	-	-	1,300	29,724,664
9205	Highway Departments	1,298	12,053,900	475	4,753,927	1,773	16,807,827
9209	General Administration	2,907	77,685,193	550	2,262,805	3,457	79,947,998

Sector 9201 is composed of fourteen health and welfare institutions (ten institutions for the care and rehabilitation of the mentally retarded, one hospital for tubercular patients, a youth development center, a diagnostic and evaluation center, and the regional administrative office for mental health programs.) These institutions had a resident population of approximately 19,000 during 1959.

Sector 9202 represents three small-to-medium sized state colleges. The total enrollment in 1959 was approximately 6,500.

Sector 9203 is composed of a maximum, a medium and a minimum security penal institution. These three institutions had an average total inmate population of 3,500 during 1959.

Data on institutional expenditures were obtained from State sources. The following discussion describes first, the method of obtaining estimated expenditure vectors for the Pennsylvania portion of the three sectors; second, the method of obtaining the New Jersey portion of the three sectors; and finally, the method of combining the two into total expenditure vectors for Sectors 9201, 9202, and 9203.

The value of output of each sector was defined as the total current operating expenditures of the institutions included. These estimated sector outputs are presented in Table 12 - 2.

Table 12 - 2

Output Estimates

State Institutional Sectors

Sector	Pennsylvania		New Jersey		Total SMSA	
	Number of Insti- tu- tions	Output (\$)	Number of Insti- tu- tions	Output (\$)	Number of Insti- tu- tions	Output (\$)
9201	11	37,730,143	3	6,710,371	14	44,440,514
9202	2	5,047,652	1	1,360,343	3	6,407,995
9203	2	4,768,949	1	1,396,321	3	6,165,270

Commonwealth of Pennsylvania

Expenditure data for the fifteen institutions in Pennsylvania were obtained with the cooperation of the Governor's office through staff interviews with the business managers and accounting personnel of the institutions. In most cases, expenditures by type were obtained from the working papers of the institutions' annual financial reports. Where this was impractical, institutional personnel were asked to estimate in detail the nature and amount of various expenditures. Hence it was possible to obtain expenditure vectors for each institution by the detailed RIS sector basis. The expenditure vectors of the institutions in each sector were then summed to obtain three total current expenditure vectors, on the RIS sector basis, for the Pennsylvania portions of 9201, 9202, and 9203.

State of New Jersey

For the five institutions in New Jersey, the total current expenditures and their breakdown by type were obtained from published

(1)

State data . A standard set of account titles was used in the presentation of the expenditures of each institution. Given these standard accounts, the three expenditure vectors of the institutions in New Jersey in Sector 9201 were added to obtain a single expenditure vector for the sector. Sectors 9202 and 9203 in New Jersey each contained a single institution.

A number of the standard account titles were similar to RIS Sectors and could be allocated directly. Others clearly indicated the RIS sectors included, but required estimation of the proportionate dollar values of the RIS sectors within the composite accounts. General accounts such as food or clothing were disaggregated on the basis of the distribution of similar accounts obtained in detail from the Pennsylvania institutions within the same sector. Hence, detailed expenditure vectors were obtained on an RIS sector basis, for the New Jersey portion of Sectors 9201, 9202, and 9203.

The three expenditure vectors for the New Jersey portion of Sectors 9201, 9202 and 9203 were then added to the previously derived vectors of the Pennsylvania portion of these sectors to obtain the total regional expenditure vectors.

State Liquor Control Board, Sector 9204

All wholesale and retail sales of liquors and wines for consumption off the premises in the Commonwealth of Pennsylvania are made through establishments owned and operated by the Commonwealth.

(1)

Budget Message for the Fiscal Year Ending June 30, 1962.
(Trenton, State of New Jersey, 1961) This publication presents in detail the 1959-60 fiscal year expenditures as well as those proposed for the 1961-62 fiscal year.

Sector 920⁽¹⁾ represents approximately 175 of these state stores in the Pennsylvania counties of the SMSA.

Operating as a State enterprise, the value of output of the State Liquor Control Board is defined as gross margin; that is, total sales less the cost of goods sold.⁽²⁾ The value of this gross margin includes total operating expenditures by the state stores, and monies returned to the State General Fund (i.e., net profits). For 1959, the State Store sales within the five county areas were reported to be \$121,200,000.⁽³⁾ Comparable data reflecting the cost of goods sold was not available from published sources. An estimate of the gross margin for 1959 was developed from information relating to net profits, operating expenditures, and sales at various points in time for the State as a whole.⁽⁴⁾ The output of the sector was therefore estimated by multiplying the total regional sales by the estimated gross margin ratio.

The Office of Computer Operations of the State Liquor Control Board provided a distribution of operating expenses for the five county area for 1965. Most of the expense account titles corresponded to RIS sectors, and those which contained more than one RIS sector were disaggregated on the basis of staff judgment. The vector of expenditures thus obtained was used as the estimate of the composition of operating expenditures for 1959

(1)

Liquor stores in the New Jersey portion of the SMSA are included in Sector 5921 as they are privately owned and operated retail establishments.

(2)

This is consistent with the treatment of other wholesale and retail establishments, as described in Chapter 7, Supra.

(3)

1963 Pennsylvania Statistical Abstract, Bureau of Statistics, Department of Internal Affairs. (Harrisburg, December 1963) Table 232, page 305.

(4)

As the 5 county area constitutes over 40% of the total sales within the Commonwealth, this procedure appears warranted.

State Highway Departments, (9205)

This sector represents the maintenance and administrative operations of the Pennsylvania and New Jersey Highway Departments in the eight county area.

The value of output of this sector is defined as the total regional current maintenance and administrative expenditures of the two departments. New road and building construction, and equipment purchases are treated separately as State capital expenditures. As with other governmental sectors, no single source of data existed; hence it was necessary to estimate total expenditures and their composition from individual State publications and later combine the data for the two states to obtain a single vector of Highway Department expenditures.

New Jersey

Expenditures by the State of New Jersey were obtained from the Governor's Budget Message ⁽¹⁾ which presented a breakdown of Highway Department Administrative expenditures by materials and services purchased. The data presented were for the entire state, and the regional expenditures for administration were estimated on the basis of the ratio of regional employment to total State employment in the Highway Department, obtained from a State publication. ⁽²⁾

Road maintenance expenditures were obtained from the New Jersey Budget Message. These expenditures were found in accounts entitled "Road Maintenance Materials and Supplies" and "Maintenance by Agreement and Contract",

(1)

Op. Cit.

(2)

"Locations of State Workers, March 1964," Division of Research and Planning, Department of Civil Service, State of New Jersey (Trenton, N. J.)

under the heading of General Operations. The ratio of regional to state employment in the highway department was again used to estimate the regional maintenance expenditures. In addition, maintenance expenditures in the region which were listed under capital construction were also included.

As a breakdown of the distribution of the costs of materials and supplies for maintenance expenditures was not available from the state, Bureau of Public Roads data were used. ⁽¹⁾ The percentages given by the Bureau of Public Roads were a weighted average for urban and rural non-interstate roads; this distribution was judged more adequate for estimation of the composition of State Highway maintenance expenditures than others available. The materials and supplies distribution was adjusted to equal 100 percent, and the total dollar value of state maintenance expenditures was multiplied by the distribution to obtain the corresponding dollar value of expenditures by item.

Administrative and maintenance expenditures were assigned to RIS sectors. With minor exceptions both the Budget Message accounts and Bureau of Public Roads distribution, for administrative and maintenance expenditures respectively, were similar to RIS sectors. The composition of the accounts which were obvious aggregations were estimated on the basis of staff judgment. The dollar values thus obtained were taken as the vector of regional current expenditures by the New Jersey State Highway Department.

(1)

U.S. Dept. of Commerce, Bureau of Public Roads, Highway Statistics 1959. (Washington, D.C., 1961). (Page 148, Table F7-2a).

Pennsylvania

Expenditures by the Pennsylvania Highway Department were obtained from a special tabulation by the Office of Administration of the Commonwealth of Pennsylvania. This data and additional information from the Highway Department provided an estimate of total expenditures, including capital, in the five county area. Estimates of wages and salaries, contractual services, total materials and supplies, road improvements and transfer payments to counties were provided. The value of output, that is total regional current expenditures, was defined as the total of wages and salaries, materials and supplies, and improvements. In the absence of detailed data reflecting the composition of the general materials and supplies expenditure in Pennsylvania, the distribution of general administrative expendi--
(1)
tures for the New Jersey portion of the sector was used to disaggregate this category.

With the use of the Bureau of Public Roads data, the total expenditure for improvements was multiplied by the adjusted percentage distribution to obtain the corresponding dollar value of maintenance expenditures by item.

The Pennsylvania Highway Department administrative and maintenance expenditures thus obtained were then assigned to RIS sectors in the same manner as described for the New Jersey expenditures.

The two vectors of administrative and maintenance expenditures for Pennsylvania and New Jersey were added to obtain a vector of

(1)

Although the account titles differ, the same basic operating expenditures were included within the aggregate accounts in the two States.

total regional current expenditures for Sector 9205.

State General Administration, (Sector 9209)

This sector represents the general administrative operations of the two State governments in the Philadelphia, Pa.-N. J. SMSA. It is composed of a number of departments and agencies in both states which could not be classified within the previously defined sectors, or meaningful functional breakdowns. These departments are listed in Table 12 - 3.

The value of output of Sector 9209 was defined as the total estimated regional expenditures of these departments, less transfers to local governments and special authorities such as school districts etc.

Data were not available in a standard form for both states; it was necessary therefore to obtain regional expenditure vectors from various state sources, and then combine them into a final vector for Sector 9209.

Table 12 - 3

Departments and Agencies Included in Sector 9209

<u>Pennsylvania</u>	<u>New Jersey</u>
Agriculture	Agriculture
Banking	Civil Service
Civil Defense	Conservation & Economic Development
Employment Security	Defense
Employment Social Security	Education
Fish Commission	Health
Forests and Waters	Judiciary
Game Commission	Labor & Industry
Health	Law & Public Safety
Insurance	Port Commission
Labor & Industry	Public Utilities
Milk Control	Toll Bridge Authority
Military Affairs	Treasury
Museum & Historical	
Parole	
Property and Supplies	
Public Instruction	
Public Utilities	
Revenue	
Securities	
State	
State Police	
Tax Equalization	
Vacational Rehabilitation	
Workmens' Insurance	

New Jersey

Total General Administrative expenditures by the State of New Jersey were obtained from the Governor's Budget Message.⁽¹⁾ This publication listed the expenditures of each department using a standard account system. Regional employment was obtained from a State publication⁽²⁾ which provided the number of employees in each

(1)

Budget Message for the Fiscal Year Ending June 30, 1962 (Trenton: State of New Jersey, 1961). All dollar values used were 1959 expenditures.

(2)

"Locations of State Workers, March 1964," Division of Research & Planning, Department of Civil Service. (Trenton, N. J.)

department and the minor civil divisions in which they were located. The expenditure accounts of each department were multiplied by the ratio of regional to statewide employment for that department to derive a vector of regional expenditures by department. These vectors of regional expenditures by department were summed to obtain a vector of total General Administrative expenditures in the New Jersey portion of the SMSA. Most of the standard account titles were similar to RIS sectors, in cases where the title indicated that a number of RIS sectors were included, it was necessary to estimate the composition and dollar values of those sectors in the aggregate accounts, to obtain the final expenditure vector.

Pennsylvania

General Administrative expenditures by the Commonwealth of Pennsylvania in the Philadelphia, Pa.-N. J. SMSA were obtained from a special tabulation by the Office of Administration of the Commonwealth of Pennsylvania. This tabulation provided expenditures in the five counties of the region by each department for the 1959-60 fiscal year. Although the largest expenditures were clearly identified as wages and salaries and transfer payments to individuals and local government, it was necessary to estimate the dollar values of expenditures within the smaller categories of "Materials and Supplies", "Administrative Costs" and "Maintenance". This was accomplished on the basis of information, provided by the various department personnel, on the composition of these expenditures, and on the basis of staff estimates of the dollar values of expenditures within each category. A vector of General Administrative expenditures by RIS sector for each department was derived from the items directly allocated and the staff estimates. These vectors were summed to obtain a single vector, by RIS sector, of General Ad-

ministrative expenditures by the Commonwealth of Pennsylvania within the Philadelphia, Pa.-N. J. SMSA.

The vectors of General Administrative expenditures of the two States were combined to produce the final vector of expenditures by RIS sectors for Sector 9209.

GENERAL APPENDICES

Part IV

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Appendix B	Manufacturing, Construction, and Mining
B-1	Interview Material
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Appendix C	Selected Non-Manufacturing Employment and Payroll Estimates.

Appendix A

SECTOR DEFINITIONS
OF THE
PHILADELPHIA REGION INPUT-OUTPUT STUDY
(RIS)

This preliminary report presents the input-output sectoring pattern which has been developed for the Philadelphia Region Input-Output Study, 1959. Section 1 defines those sectors which have been identified within the Philadelphia, Pa.-N.J. SMSA and for which production vectors have been developed. Section 2 defines, in a consistent manner, those sectors which did not produce within the study area during the base year.

The RIS sector codes appear in the first column and are used throughout the study. These codes are similar in nature to the appropriate four digit SIC codes, with zeros appearing in the fourth digit when aggregations were made.

The SIC codes, appearing in the third column, are those of the Standard Industrial Classification Manual, 1957 edition, as prepared by the U. S. Bureau of the Budget.

This preliminary report presents the input-output sectoring pattern which has been developed for the Philadelphia Region Input-Output Study, 1959. Section 1 defines those sectors which have been identified within the Philadelphia, Pa.-N.J. SMSA and for which production vectors have been developed. Section 2 defines, in a consistent manner, those sectors which did not produce within the study area during the base year.

The RIS sector codes appear in the first column and are used throughout the study. These codes are similar in nature to the appropriate four digit SIC codes, with zeros appearing in the fourth digit when aggregations were made.

The SIC codes, appearing in the third column, are those of the Standard Industrial Classification Manual, 1957 edition, as prepared by the U. S. Bureau of the Budget.

SECTION 1

MINING AND CONSTRUCTION

RIS Sector Codes	Titles	SIC Codes
<u>AGRICULTURE, FORESTRY AND FISHERIES</u>		
0120	Fruit & Vegetable Products	0122, 0123
0132	Dairy Products	0132
0133	Poultry Products	0133
0190	Other Agricultural Products	011, 0139, 014, 019, 0729 pt, 021
0708	Agricultural, Forestry, & Fishery Services	071, 0723, 0729 pt, 085, 098
0809	Forestry & Fishery Products	074, 081, 082, 084, 086, 091
<u>MINING</u>		
1411	Dimension Stone	1411
1421	Crushed & Broken Stone	1421
1441	Sand & Gravel	1441
1490	Mining, not elsewhere classified	145, 148, 149
<u>CONSTRUCTION</u>		
1511	General Contractors	1511
1611	Highway & Street Construction	1611
1621	Heavy Construction	1621
1711	Plumbing, Heating, & Air Conditioning Contractors	1711
1731	Electrical Contractors	1731
1701	Special Trade Contractors, not elsewhere classified	172, 174, 175, 176, 177, 178, 179
1509	Maintenance & Repair Construction	(dummy)
6560	Residential Contractors, Developers, Builders, etc.	6551, 6561

MANUFACTURING

1900	Ordnance & Accessories	19
	20	
2011	Meat Packing Plants	2011
2013	Sausage & Other Prepared Meat Products	2013
2015	Poultry & Small Game Dressing & Packing	2015
2020	Creamery Butter & Natural Cheese	2021, 2022
2024	Ice Cream & Frozen Desserts	2024
2026	Fluid Milk	2026
2031	Canned & Cured Sea Foods	2031
2032	Canned Specialties	2032
2033	Canned Fruits, Vegetables, Preserves, Jams, & Jellies	2033
2035	Pickled Fruits & Vegetables	2035
2036	Fresh or Frozen Packaged Fish	2036
2037	Frozen Fruits, Fruit Juices, Vegetables, & Specialties	2037
2041	Flour & Other Grain Mill Products	2041
2042	Prepared Feeds for Animals & Fowls	2042
2043	Cereal Preparations	2043
2045	Blended & Prepared Flour	2045
2046	Wet Corn Milling	2046
2051	Bread & Other Bakery Products	2051
2052	Biscuit, Crackers, & Pretzels	2052
2062	Cane Sugar Refining	2062
2071	Candy & Other Confectionery Products	2071
2072	Chocolate & Cocoa Products	2072
2073	Chewing Gum	2073
2082	Malt Liquors	2082
2084	Wines, Brandy, & Brandy Spirits	2084
2085	Distilled, Rectified, & Blended Liquors	2085
2086	Bottled & Canned Soft Drinks & Carbonated Waters	2086
2087	Flavoring Extracts & Flavoring Syrups, not elsewhere classified	2087

2090	Food Preparations, not elsewhere classified	2025, 2093, 2098, 2099
2094	Grease & Tallow	2094
2095	Animal & Marine Fats & Oils, exc. Grease Tallow	2095
2096	Shortening, Table Oils, Margarine	2096
2097	Manufactured Ice	2097
	21	
2111	Cigarettes	2111
2121	Cigars	2121
2131	Tobacco & Snuff	2131
	22	
2211	Broad Woven Fabric Mills, Cotton	2211
2221	Broad Woven Fabric Mills, Man-Made Fiber & Silk	2221
2231	Broad Woven Fabric Mills, Wool	2231
2241	Narrow Fabrics & Other Smallwares Mills	2241
2251	Full-Fashioned Hosiery Mills	2251
2252	Seamless Hosiery Mills	2252
2253	Knit Outerwear Mills	2253
2254	Knit Underwear Mills	2254
2256	Knit Fabric Mills	2256
2259	Knitting Mills, not elsewhere classified	2259
2261	Finishers of Broad Woven Fabrics of Cotton	2261
2262	Finishers of Broad Woven Fabrics of Man- Made Fiber & Silk	2262
2269	Dying & Finishing Textiles, not elsewhere classified	2269
2271	Woven Carpets & Rugs	2271
2272	Tufted Carpets & Rugs	2272
2279	Carpets, Rugs, & Mats, not elsewhere classified	2279
2281	Yarn Spinning Mills	2281
2282	Yarn Throwing, Twisting, & Winding Mills	2282
2283	Yarn Mills, Wool, incl. Carpet & Rug Yarn	2283
2284	Thread Mills	2284

2291	Felt Goods, exc. Woven Felts & Hats	2291
2292	Lace Goods	2292
2293	Paddings & Upholstery Filling	2293
2294	Processed Waste & Recovered Fibers & Flock	2294
2295	Artificial Leather, Oilcloth, etc.	2295
2297	Wool Scouring, Worsted Combing, & Tow to Top Mills	2297
2298	Cordage & Twine	2298
2299	Textile Goods, not elsewhere classified	2299
23		
2311	Men's, Youths', & Boys' Suits, Coats, & Overcoats	2311
2321	Men's, Youths', & Boys' Shirts, Collars, & Nightwear	2321
2322	Men's, Youths', & Boys' Underwear	2322
2323	Men's, Youths', & Boys' Neckwear	2323
2327	Men's, Youths', & Boys' Separate Trousers	2327
2328	Work Clothing	2328
2329	Men's, Youths', & Boys' Clothing, not elsewhere classified	2329
2331	Blouses, Waists, & Shirts	2331
2335	Dresses	2335
2337	Suits, Skirts, & Coats, exc. Fur Coats & Raincoats	2337
2339	Women's, Misses', & Juniors' Outerwear, not elsewhere classified	2339
2341	Women's, Misses', Children's & Infants' Underwear	2341
2342	Corsets & Allied Garments	2342
2351	Millinery	2351
2352	Men's & Boys' Hats & Caps	2352
2361	Dresses, Blouses, Waists, & Shirts	2361
2363	Coats & Suits	2363
2369	Girls', Children's, & Infants' Outerwear, not elsewhere classified	2369
2371	Fur Goods	2371

2381	Dresses & Work Gloves, exc. Knit & All Leather	2381
2384	Robes & Dressing Gowns	2384
2385	Raincoats & Other Waterproof Outer Garments	2385
2386	Leather & Sheep Lined Clothing	2386
2387	Apparel Belts	2387
2389	Apparel, not elsewhere classified	2389
2391	Curtains & Draperies	2391
2392	Housefurnishings, exc. Curtains & Draperies	2392
2393	Textile Bags	2393
2394	Canvas Products	2394
2395	Pleating, Decorative & Novelty Stitching, & Tucking for the trade	2395
2396	Apparel Findings & Related Products	2396
2397	Schiffli Machine Embroideries	2397
2399	Fabricated Textile Products, not elsewhere classified	2399
24		
2421	Sawmills & Planing Mills, General	2421
2431	Millwork Plants	2431
2433	Prefabricated Wooden Buildings & Structural Members	2433
2441	Nailed & Lock Corner Wooden Boxes & Shook	2441
2443	Veneer & Plywood Containers, exc. Boxes & Crates	2443
2445	Cooperage	2445
2490	Wood Products, not elsewhere classified	2411, 2442, 2490
2491	Wood Preserving	2401
25		
2511	Wood Household Furniture, exc. Upholstered	2511
2512	Wood Household Furniture, Upholstered	2512
2514	Metal Household Furniture	2514
2515	Mattresses & Bedsprings	2515
2519	Household Furniture, not elsewhere classified	2519

2521	Wood Office Furniture	2521
2522	Metal Office Furniture	2522
2531	Public Building & Related Furniture	2531
2541	Wood Partitions, Shelving, Lockers, & Office & Store Furniture	2541
2542	Metal Partitions, Shelving, Lockers, & Office & Store Fixtures	2542
2591	Venetian Blinds & Shades	2591
2599	Furniture & Fixtures, not elsewhere classified	2599
26		
2621	Paper Mills, exc. Building Paper Mills	2621
2631	Paperboard Mills	2631
2640	Converted Paper & Paperboard Products, not elsewhere classified	2644, 2649
2641	Paper Coating & Glazing	2641
2642	Envelopes	2642
2643	Bags, exc. Textile Bags	2643
2645	Die Cut Paper & Paperboard; & Cardboard	2645
2651	Folding Paperboard Boxes	2651
2652	Set-Up Paperboard Boxes	2652
2653	Corrugated & Solid Fiber Boxes	2653
2654	Sanitary Food Containers	2654
2655	Fiber Cans, Tubes, Drums, & Similar Products	2655
2661	Building Paper & Building Board Mills	2661
27		
2711	Newspapers: Publishing, Publishing & Printing	2711
2721	Periodicals: Publishing, Publishing & Printing	2721
2731	Books: Publishing, Publishing & Printing	2731
2732	Book Printing	2732
2741	Miscellaneous Publishing	2741
2751	Commercial Printing, exc. Lithographic	2751
2752	Commercial Printing, Lithographic	2752
2753	Engraving & Plate Printing	2753

2761	Manifold Business Forms Manufacturing	2761
2771	Greeting Card Manufacturing	2771
2782	Blankbooks, Loose Leaf Binders, & Devices	2782
2789	Bookbinding & Miscellaneous Related Work	2789
2791	Typesetting	2791
2793	Photoengraving	2793
2794	Electrotyping & Stereotyping	2794
2799	Service Industries for the Printing Trades, not elsewhere classified	2799
28		
2813	Industrial Gases	2813
2814	Cyclic Crudes	2814
2815	Dyes, Dye (cyclic) Intermediates & Organic Pigments	2815
2816	Inorganic Pigments	2816
2818	Industrial Organic Chemicals, not elsewhere classified	2818
2819	Industrial Inorganic Chemicals, not else- where classified	2819
2821	Plastics Materials, Synthetic Resins, & Nonvulcanizable Elastomers	2821
2830	Pharmaceutical Preparations	2831, 2834
2841	Soap & Other Detergents	2841
2842	Specialty Cleaning, Polishing & Sanitation Preparations	2842
2843	Surface Active Agents, Finishing Agents, Sulfonated Oils & Assistants	2843
2844	Perfumes, Cosmetics, & Other Toilet Prepara- tions	2844
2851	Paints, Varnishes, Lacquers, & Enamels	2851
2852	Putty, Calking Compounds & Allied Products	2852
2861	Gum & Wood Chemicals	2861
2870	Agricultural Chemicals	2873, 2879
2871	Fertilizers	2871

2891	Glue & Gelatin	2891
2892	Explosives	2892
2893	Printing Ink	2893
2894	Fatty Acids	2894
2895	Carbon Black	2895
2899	Chemicals & Chemical Preparations, not elsewhere classified	2899
29		
2911	Petroleum Refining	2911
2951	Paving Mixtures & Blocks	2951
2952	Asphalt Felts & Coatings	2952
2992	Lubricating Oils & Greases	2992
2999	Products of Petroleum & Coal, not elsewhere classified	2999
30		
3011	Tires & Inner Tubes	3011
3021	Rubber Footwear	3021
3031	Reclaimed Rubber	3031
3069	Fabricated Rubber Products, not elsewhere classified	3069
3079	Miscellaneous Plastic Products	3079
31		
3111	Leather Tanning & Finishing	3111
3121	Industrial Leather Belting & Packing	3121
3131	Boot & Shoe Cut Stock & Findings	3131
3141	Footwear, exc. House Slippers & Rubber Footwear	3141
3142	House Slippers	3142
3161	Luggage	3161
3171	Women's Handbags & Purses	3171
3172	Personal Leather Goods, exc. Handbags & Purses	3172
3199	Leather Goods, not elsewhere classified	3199

32

3211	Flat Glass	3211
3221	Glass Containers	3221
3229	Pressed & Blown Glass & Glassware, not elsewhere classified	3229
3231	Glass Products Made of Purchased Glass	3231
3241	Cement, Hydraulic	3241
3251	Brick & Structural Clay Tile	3251
3253	Ceramic Wall & Floor Tile	3253
3255	Clay Refractories	3255
3259	Structural Clay Products, not elsewhere classified	3259
3261	Vitreous China Plumbing Fixtures	3261
3269	Pottery Products, not elsewhere classified	3269
3271	Concrete Brick & Block	3271
3272	Concrete Products, exc. Block & Brick	3272
3273	Ready Mixed Cement	3273
3274	Lime	3274
3275	Gypsum Products	3275
3281	Cut Stone & Stone Products	3281
3291	Abrasive Products	3291
3292	Asbestos Products	3292
3293	Steam & Other Packing, & Pipe & Boiler Covering	3293
3295	Minerals & Earths	3295
3296	Mineral Wool	3296
3297	Nonclay Refractories	3297
3299	Nonmetallic Mineral Products, not elsewhere classified	3299

33

3312	Blast Furnaces, Steel Works, & Rolling Mills	3312
3315	Steel Wire Drawing, & Steel Nails & Spikes	3315
3316	Cold Rolled Sheet, Strip, & Bars	3316
3317	Steel Pipe & Tubes	3317

3321	Gray Iron Foundries	3321
3323	Steel Iron Foundries	3323
3330	Primary Smelting & Refining of Nonferrous Metals	3331, 3339
3333	Primary Smelting & Refining of Zinc	3333
3334	Primary Production of Aluminum	3334
3341	Secondary Smelting, Refining, & Alloying of Nonferrous Metals	3341
3351	Rolling, Drawing, & Extruding of Copper	3351
3352	Rolling, Drawing, & Extruding of Aluminum	3352
3356	Rolling, Drawing, & Extruding of Other Nonferrous Metals	3356
3357	Drawing & Insulating of Nonferrous Wire	3357
3361	Aluminum Castings	3361
3362	Brass, Bronze, Copper, Copper Base Alloy Castings	3362
3369	Nonferrous Castings, not elsewhere classified	3369
3390	Primary Metal Industries, not elsewhere classified	3392, 3399
3391	Iron & Steel Forgings	3391
	34	
3411	Metal Cans	3411
3421	Cutlery	3421
3423	Hand & Edge Tools, exc. Machine Tools & Saws	3423
3425	Hand Saws & Saw Blades	3425
3429	Hardware, not elsewhere classified	3429
3431	Enameled Iron & Metal Sanitary Ware	3431
3432	Plumbing Fixture Fittings & Trim	3432
3433	Heating Equipment, exc. Electric	3433
3441	Fabricated Structural Steel	3441
3442	Metal Doors, Sash, Frames, Molding, & Trim	3442
3443	Fabricated Plate Work (Boiler Shops)	3443
3444	Sheet Metal Work	3444
3449	Architectural & Miscellaneous Metal Work	3449

3451	Screw Machine Products	3451
3452	Bolts, Nuts, Screws, Rivets & Washers	3452
3461	Metal Stampings	3461
3471	Electroplating, Plating, Polishing, Anodizing & Coloring	3471
3479	Coating, Engraving, & Allied Services, not elsewhere classified	3479
3481	Miscellaneous Fabricated Wire Products	3481
3491	Metal Shipping Barrels, Drums, Kegs & Pails	3491
3493	Steel Springs	3493
3494	Valve & Pipefittings, exc. Plumbers' Brass Goods	3494
3496	Collapsible Tubes	3496
3497	Metal Foil & Leaf	3497
3498	Fabricated Pipe & Fabricated Pipe Fittings	3498
3499	Fabricated Metal Products, not elsewhere classified	3499
35		
3510	Steam Engines, Steam, Gas, & Hydraulic Turbines; and Steam, Gas, & Hydraulic Tur- bine Generator Set Units & Other Internal Combustion Engines, not elsewhere classified	3511, 3519
3522	Farm Machinery & Equipment	3522
3531	Construction Machinery & Equipment	3531
3534	Elevators & Moving Stairways	3534
3535	Conveyors & Conveying Equipment	3535
3536	Hoist, Industrial Cranes, & Monorail Systems	3536
3537	Industrial Trucks, Tractors, Trailers, & Stackers	3537
3541	Machine Tools, Metal Cutting Types	3541
3542	Machine Tools, Metal Forming Types	3542
3544	Special Dies & Tools, Die Sets, Jigs & Fixtures	3544
3545	Machine Tool Accessories & Measuring Devices	3545
3548	Metal Working Machinery, exc. Machine Tools	3548

3551	Food Products Machinery	3551
3552	Textile Machinery	3552
3553	Woodworking Machinery	3553
3554	Paper Industries Machinery	3554
3555	Printing Trades Machinery & Equipment	3555
3559	Special Industry Machinery, not elsewhere classified	3559
3561	Pumps, Air & Gas Compressors & Pumping Equipment	3561
3562	Ball & Roller Bearings	3562
3564	Blowers Exhaust & Ventilating Fans	3564
3565	Industrial Patterns	3565
3566	Mechanical Power Transmission Equipment, exc. Ball & Roller Bearings	3566
3567	Industrial Process Furnaces & Ovens	3567
3569	General Industrial Machinery & Equipment, not elsewhere classified	3569
3571	Computing & Accounting Machines, incl. Cash Registers	3571
3576	Scales & Balances, exc. Laboratory	3576
3579	Office Machines, not elsewhere classified	3579
3581	Automatic Merchandising Machines	3581
3582	Commercial Laundry, Dry Cleaning, & Pro- cessing Machines	3582
3585	Refrigerators, Refrigeration Machinery, exc. Household, & Complete Air Conditioning Units	3585
3586	Measuring & Dispensing Pumps	3586
3589	Service Industry Machines, not elsewhere classified	3589
3590	Machinery & Parts, exc. Electrical, not elsewhere classified	3532, 3599
3591	Machine Shops, Jobbing & Repair	3591
	36	
3611	Electric Measuring Instruments & Test Equipment	3611
3612	Power Distribution & Specialty Transformers	3612
3613	Switchgear & Switchboard Apparatus	3613

3621	Motors & Generators	3621
3622	Industrial Controls	3622
3623	Welding Apparatus	3623
3624	Carbon & Graphite Products	3624
3629	Electrical Industrial Apparatus, not elsewhere classified	3629
3631	Household Cooking Equipment	3631
3633	Household Laundry Equipment	3633
3634	Electric Housewares & Fans	3634
3635	Household Vacuum Cleaners	3635
3639	Household Appliances, not elsewhere classified	3639
3642	Lighting Fixtures	3642
3643	Current Carrying Wiring Devices	3643
3644	Noncurrent Carrying Wiring Devices	3644
3651	Radio & T.V. Receiving Sets, exc. Communication Types	3651
3652	Phonograph Records	3652
3661	Telephone & Telegraph Apparatus	3661
3662	Radio & T.V. Transmitting, Signaling, & Detection Equipment & Apparatus	3662
3671	Radio & T.V. Receiving Type Electrode Tubes	3671
3672	Cathode Ray Picture Tubes	3672
3679	Electronic Components & Accessories, not elsewhere classified	3679
3690	Electrical Machinery Equipment & Supplies, not elsewhere classified	3641, 3699
3691	Storage Batteries	3691
3693	X-ray Apparatus & Tubes	3693
3694	Electrical Equipment for Internal Combustion Engines	3694
37		
3711	Motor Vehicles	3711
3713	Truck & Bus Bodies	3713
3714	Motor Vehicle Parts & Accessories	3714
3715	Truck Trailers	3715

3721	Aircraft	3721
3722	Aircraft Engines & Engine Parts	3722
3729	Aircraft Parts & Equipment, not elsewhere classified	3729
3731	Ship Building & Repairing	3731
3732	Boat Building & Repairing	3732
3741	Locomotives & Parts	3741
3791	Trailer Coaches	3791
3799	Transportation Equipment, not elsewhere classified	3799
38		
3811	Engineering, Laboratory, & Scientific & Research Instruments & Associated Equipment	3811
3821	Mechanical Measuring & Controlling Instruments	3821
3822	Automatic Temperature Controls	3822
3831	Optical Instruments & Lenses	3831
3841	Surgical & Medical Instruments & Apparatus	3841
3842	Orthopedic, Prosthetic, & Surgical Appliances	3842
3843	Dental Equipment & Supplies	3843
3861	Photographic Equipment & Supplies	3861
39		
3911	Jewelry, Precious Metal	3911
3913	Lapidary Work & Cutting & Polishing Diamonds	3913
3914	Silverwear & Plated Ware	3914
3931	Musical Instruments & Parts	3931
3941	Games & Toys	3941
3942	Dolls	3942
3949	Children's Vehicles, exc. Bicycles	3949
3951	Pens, Pen Points, Fountain Pens, Ball Point Pens, Mechanical Pencils & Parts	3951
3952	Lead Pencils, Crayons, & Artists' Materials	3952
3953	Marking Devices	3953
3955	Carbon Paper & Inked Ribbons	3955

3961	Costume Jewelry & Costume Novelties, exc. Precious Metal	3961
3962	Feathers, Plumes, & Artificial Flowers	3962
3964	Needles, Pins, Hooks & Eyes, & Similar Notions	3964
3981	Brooms & Brushes	3981
3982	Linoleum, Asphalt Felt-Base, & Other Hard Surface Floor Coverings, not elsewhere classified	3982
3984	Candles	3984
3987	Lamp Shades	3987
3988	Mortician's Goods	3988
3992	Furs, Dressed & Dyed	3992
3993	Signs & Advertising Displays	3993
3995	Umbrellas, Parasols, & Canes	3995
3999	Manufacturing Industries, not elsewhere classified	3851, 3912 3963, 3999

TRANSPORTATION, COMMUNICATIONS, ELECTRIC, GAS AND SANITARY
SERVICES

4011	Railroads	4011, 4013
4111	Local & Suburban Transit	4111
4121	Taxicabs	4121
4210	Trucking, Local & Long Distance	421
4220	Public Warehousing	422
4400	Water Transportation	44
4500	Air Transportation	45
4190	Transportation Services, not elsewhere classified	4020, 4041, 4119, 413, 414, 415, 417, 4231, 46, 47
4811	Telephone Communication	4811
4832	Radio Broadcasting	4832
4833	Television Broadcasting	4833
4890	Communication Services, not elsewhere classified	4821, 4899

4911	Electric Companies & Systems	4961, 4911, 4931 pt
4920	Gas Companies & Systems	492 & 4932 pt
4941	Water Supply	4941
4990	Sanitary & Other Utility Systems, not else- where classified	4939, 495, 497

WHOLESALE TRADE

5012	Automobiles & Other Motor Vehicles	5012
5013	Automotive Equipment	5013
5014	Tires & Tubes	5014
5022	Drugs, Drug Proprieties, & Druggists' Sundries	5022
5028	Paints & Varnishes	5028
5029	Chemicals & Allied Products, not elsewhere classified	5029
5032	Dry Goods, Piece Goods, & Notions	5032
5035	Apparel & Accessories, Hosiery, & Lingerie	5035
5039	Footwear	5039
5042	Groceries, General Line	5042
5043	Dairy Products	5043
5044	Poultry & Poultry Products	5044
5045	Confectionery	5045
5046	Fish & Sea Foods	5046
5047	Meats & Meat Products	5047
5048	Fresh Fruits & Vegetables	5048
5049	Groceries & Related Products, not elsewhere classified	5049
5051	Farm Products, Raw Materials	5051
5062	Electrical Merchandise, General Line	5062
5063	Electrical Apparatus & Equipment, Wiring Supplies, & Construction Materials	5063
5064	Electrical Appliances, Television & Radio Sets	5064
5065	Electronic Parts & Equipment	5065

5072	Hardware	5072
5074	Plumbing & Heating Equipment & Supplies	5074
5077	Air Conditioning & Refrigeration Equipment & Supplies	5077
5082	Commercial & Industrial Machinery, Equipment, & Supplies	5082
5083	Farm Machinery & Equipment	5083
5086	Professional Equipment & Supplies	5086
5087	Equipment & Supplies for Service Establishments	5087
5089	Machinery, Equipment, & Supplies, not elsewhere classified	5088, 5089
5091	Metals & Minerals, exc. Petroleum & Scrap	5091
5092	Petroleum Bulk Stations & Terminals	5092
5093	Scrap & Waste Materials	5093
5099	Miscellaneous Wholesalers, not elsewhere classified	5094, 5095, 5096, 5097, 5098, 5099

RETAIL TRADE

5210	Lumber & Other Building Materials Dealers	521
5221	Heating & Plumbing Equipment Dealers	5221
5231	Paint, Glass, & Wallpaper Stores	5231
5241	Electrical Supply Stores	5241
5250	Hardware Stores & Farm Equipment Dealers	525
5311	Department Stores	5311
5342	Mail Order Houses & Merchandise Vending Machine Operators	534, 532
5331	Limited Price Variety Stores	5331
5351	Direct Selling Organizations	5351
5390	Miscellaneous General Merchandise Stores	539
5411	Grocery Stores	5411
5420	Meat & Fish Markets	542
5431	Fruit Stores & Vegetable Markets	5431
5441	Candy, Nut, & Confectionery Stores	5441
5460	Retail Bakeries	546
5490	Miscellaneous Food Stores, not elsewhere classified	5451, 549

5511	Motor Vehicle Dealers	5511
5521	Motor Vehicle Dealers, (used cars only)	5521
5531	Tire, Battery, & Accessory Dealers	5531
5541	Gasoline Service Stations	5541
5599	Miscellaneous Aircraft, Marine, & Automotive Dealers	5599
5610	Men's & Boys' Clothing & Furnishings Stores	561
5621	Women's Ready-to-Wear Stores	5621
5630	Women's Accessory & Specialty Stores	563
5641	Children's & Infants' Wear Stores	5641
5651	Family Clothing Stores	5651
5660	Shoe Stores	566
5690	Miscellaneous Apparel & Accessory Stores, not elsewhere classified	5671, 5681, 5699
5710	Furniture, Home Furnishings, & Equipment Stores	571
5722	Household Appliance Stores	5722
5730	Radio, Television, & Music Stores	573
5812	Eating Places	5812
5813	Drinking Places	5813
5912	Drug Stores & Proprietary Stores	5912
5921	Liquor Stores	5921
5940	Book & Stationery Stores	594
5950	Sporting Goods Stores & Bicycle Shops	595
5971	Jewelry Stores	5971
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FINANCE, INSURANCE, AND REAL ESTATE

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6300	Security & Commodity Brokers, Dealers, Exchanges, & Services	62
6301	Non-Life Insurance Carriers	632 pt, 633, 635, 636, 639
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9302	Local Borough Township Government	9302
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SECTION 2

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2034	Dried & Dehydrated Fruits & Vegetables	2034
2044	Rice Milling	2044
2061	Cane Sugar, exc. Refining Only	2061
2063	Beet Sugar	2063
2083	Malt	2083
2091	Cottonseed Oil Mills	2091
2092	Soybean Oil Mills	2092
2141	Tobacco Stemming & Redrying	2141
2296	Tire Cord & Fabric	2296
2426	Hardwood Dimension & Flooring Mills	2426
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2611	Pulp Mills	2611
2646	Pressed & Molded Pulp Goods	2646
2812	Alkalies & Chlorine	2812
2822	Synthetic Rubber (Vulcanizable Elastomers)	2822
2823	Cellulosic Man-Made Fibers	2823
2824	Synthetic Organic Fibers, exc. Cellulosic	2824
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3151	Leather Dress, Semidress, & Work Gloves	3151
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3632	Household Refrigerators & Home & Farm Freezers	3632
3636	Sewing Machines	3636
3673	Transmitting, Industrial, & Special Purpose Electron Tubes	3673
3692	Primary Batteries, Dry & Wet	3692
3712	Passenger Car Bodies	3712
3723	Aircraft Propellers & Propeller Parts	3723
3742	Railroad & Street Cars	3742
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APPENDIX B-1

Interview Materials

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UNIVERSITY of PENNSYLVANIA

PHILADELPHIA 4

*Wharton School of
Finance and Commerce*

Dr. Walter Isard, who is a member of the Governor's Council of Science and Technology and Professor of Economics and Regional Science, the Wharton School, is conducting a major study on the economy of the Philadelphia Metropolitan region. This study is important because it will assist the Council, business groups, the state and city governments, and other important bodies, in identifying the types of industries which would be most desirable to promote in the Philadelphia region. As you are aware, the city of Philadelphia itself is experiencing an undesirably high rate of unemployment. It is therefore essential, both from the standpoint of eliminating unemployment in the Philadelphia area and for stimulating the growth of the Philadelphia area, that we give Dr. Isard all the encouragement and assistance we can in completing his important study.

Dr. Isard is constructing a detailed sales and purchases table in order to reveal the different markets that exist for different products in the Philadelphia region. To do this it is necessary that he obtain information on purchases and sales from your firm as well as others. You can rest assured that whatever data you provide him will be kept in strictest confidence, and no data will be published which would reveal information on individual firms.

I would therefore greatly appreciate it if you could cooperate with Dr. Isard in supplying the information he requests. Dr. Isard or one of his associates will shortly be in touch with you on this matter. Enclosed is a copy of a letter from Pennsylvania's Secretary of Commerce, John K. Tabor, indicating the State's interest in the study.

Sincerely yours,

Willis J. Winn
Dean



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF COMMERCE
HARRISBURG

May 12, 1964

THE SECRETARY

Professor Walter Isard
Department of Regional Science
The Wharton School of Finance
and Commerce
Philadelphia 4, Pennsylvania

Dear Professor Isard:

I am delighted to learn of your interest in, and forthcoming study on the economy of the Philadelphia Metropolitan Region. As a member of the Governor's Council of Science and Technology you well know the importance of this study. Your goal of identifying the types of industries which would be most desirable to promote in the Philadelphia Region appears to be a primary requisite in eliminating unemployment and stimulating long-run growth in this region. Further, the healthy development of the Philadelphia Region will be of great significance for strengthening the economy of the State of Pennsylvania.

I am, therefore, hopeful that the business firms in your region will cooperate fully in providing the essential data which you require. I wish you success in your study and eagerly await your results.

Sincerely yours,

A handwritten signature in cursive script that reads "John K. Tabor".
John K. Tabor

JKT:lc

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ECONOMIC DATA: WHARTON SCHOOL PHILADELPHIA REGION STUDY

Please complete this questionnaire
and mail to:

If any questions arise with regard
to specific items in this question-
naire, please call:

Professor Walter Isard
Department of Regional Science
The Wharton School
University of Pennsylvania
Philadelphia 4, Pennsylvania

Professor Gerald J. Karaska
University of Pennsylvania
Philadelphia
594 - 7744 or 594 - 8411

Information is requested for Calendar year 1959. If it is not possible
to provide data for 1959, please do so for the nearest year after 1959.
Specify here the year used, if not 1959. If your records are arranged
by fiscal year, you may use the fiscal year; simply indicate if used.

Please report information (data) only for the plant listed below.

The Philadelphia region includes the following counties: in Pennsylvania,
Bucks, Chester, Delaware, Montgomery, Philadelphia; in New Jersey,
Burlington, Camden, Gloucester.

1. Name of Establishment:
2. Address of Establishment:
3. Respondent's Name:
4. Respondent's Position:
5. Average Employment*
6. Total Wages and Salaries (payroll)*

*See attached supplementary information sheet for particulars regarding
these items.

7. Materials Used in Production*

Type of Material (Specify in Detail)	Total Costs	Indicate if Transportation is included in Total Costs*	Origin of Shipments	
			Percent in Philadelphia Region	Percent outside Phila. Region. If Possible breakdown by state or other geographical area
Example: Steel casting	\$100,000	transport cost included	25%	75%
a.				
b.				
c.				
d.				
e.				
f.				
g.				
h.				
i.				
j.				
k.				

*See attached supplementary information sheet for particulars regarding these items.

8. Sales (Value of Shipments)*

Type of Product (Specify in Detail)	Sales Value of Shipments	Indicate if Transportation is included in Sales Value	Sales To:			
			House- holds (Direct)	Retail Outlets	Wholesale- sellers	Other Manuf. Firms Phila. Region Percent Outside Phila. Region Percent
Example: tractors	\$1,000,000	transport costs not included		20%	30%	25% 25%
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						
i.						
j.						
k.						

*See attached supplementary information sheet for particulars regarding these items.

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9. Products Shipped to Other Manufacturing Firms Outside Philadelphia Region (Continued from Table 8).

Type of Product (Same as in Table 8)	Sales To Other Manufacturing Firms---Outside Philadelphia Region	
	Purchasing Industry - group*	Value
Example:	#5 - Coal Mining	\$ 50,000
a. Tractors	#37 - Construction and mining Machinery	\$200,000
a.		
b.		
c.		
d.		

* See attached list of industry groups

10. Expenditures on Power and Energy:

- a. coal
- b. gas
- c. oil
- d. electricity

11. All other current operating expenses--exclude all investment expenditures. (Note - Payroll, Material inputs, Power and Energy expenditures also excluded.)

SALES TO DEFENSE RELATED AGENCIES*

1. What percentage of your sales in fiscal 1960 (July 1960 to June 30, 1961) went directly to defense related agencies, ie. direct sales as part of a prime government contract?
2. If you are a prime contractor, what percentage of the prime contracts was subcontracted to another firm?
3. What percentage of your sales in fiscal 1960 went indirectly to defense related agencies, ie. sales going to another firm and which could be designated as a subcontract on a prime defense contract?
4. For subcontract sales, please indicate the percentage of their distribution by geographic area:

	Subcontracts from Your Prime Contracts	Subcontracts from Another Firm's Prime Contracts
--	---	--

- (a) Philadelphia Metropolitan Area**
- (b) rest of Pennsylvania
- (c) rest of New Jersey
- (d) California
- (e) Massachusetts
- (f) Connecticut
- (g) Texas
- (h) List other states

*Dept. of Army, Dept. of Navy, Dept. of Air Force, Dept. of Defense, National Aeronautics and Space Administration.

**Counties of Philadelphia, Bucks, Montgomery, Delaware, Chester, Camden, Gloucester, Burlington.

Instructions

We have attempted to keep the accompanying questionnaire simple and short, and to ask for figures which would be readily available in business records. Most definitions of sales and purchase items conform to those used by the U.S. Bureau of the Census and are likely to have been calculated for previous census returns.

Notes on specific questions --

- Question 5 Average Employment. This is the Census definition. If you have to calculate a figure it should be the average of employments during March, May, August, and November of the year used. Please include wage and salary employees in this figure.
- Question 6 Wages and Salaries (payroll). This should be the definition used for Federal withholding tax calculation. It includes all compensation such as commissions, bonuses, vacation pay, etc., before deductions of taxes and other similar items.
- Question 7 Materials Used in Production. Costs should be the amounts paid (after discounts and including freight charges) for materials and components actually put into production during the year. If you pick up items in your own trucks or otherwise cannot include freight charges, please indicate in the right hand column. Note that components purchased through contracts or sub-contracts should be included.
- Question 8 Sales (value of Shipments). Sales should be after discounts and allowances, f.o.b. plant, and excluding excise taxes and freight charges. (If freight charges cannot be excluded, or if you deliver in your own trucks, please indicate so in the extreme right hand column.)
- Question 11 All other operating expenses. This should include rents, taxes, insurance, warehousing, telephone and telegraph, office supplies, advertising, and any other business services. It should exclude all capital (investment) expenditures and, desirably, depreciation allowances.

Question 9 The purchasing industries may be classified by s.i.c. number or by the following industry groups if you choose not to list companies:

Sector

1. Livestock and products
2. All other agricultural products
3. Forestry and fishery products
4. Agricultural, forestry & fishery services
5. Coal mining
6. Food and kindred products
7. Tobacco Manufacturing
8. Broad & narrow fabrics, yarn & thread mills
9. Miscellaneous textile goods, including floor coverings
10. Apparel
11. Miscellaneous fabricated textile products
12. Lumber & products, except wooden containers
13. Wooden containers
14. Household Furniture
15. Other furniture and fixtures
16. Paper and allied products, except paperboard containers and boxes
17. Paperboard containers and boxes
18. Printing and publishing
19. Chemicals
 - a) Mining
 - b) Manufacturing
20. Plastics and synthetics
21. Drugs and toilet preparations
22. Paint and allied products
23. Petroleum and related products
 - a) Mining
 - b) Manufacturing
24. Rubber & miscellaneous plastic products
25. Industrial leather
26. Other leather products
27. Glass and glass products
28. Stone and clay and their products
29.
 - a) Mining
 - b) Manufacturing
29. Iron and Steel
 - a) Mining
 - b) Manufacturing
30. Nonferrous metals
 - a) Mining
 - b) Manufacturing
31. Metal cans, shipping barrels, drums, kegs and pails
32. Heating, plumbing and fabricated structural metal products
33. Screw machine products, stampings and bolts, nuts, etc.
34. Other fabricated metal products
35. Engines and turbines
36. Farm machinery and equipment
37. Construction and mining machinery and equipment

-3-

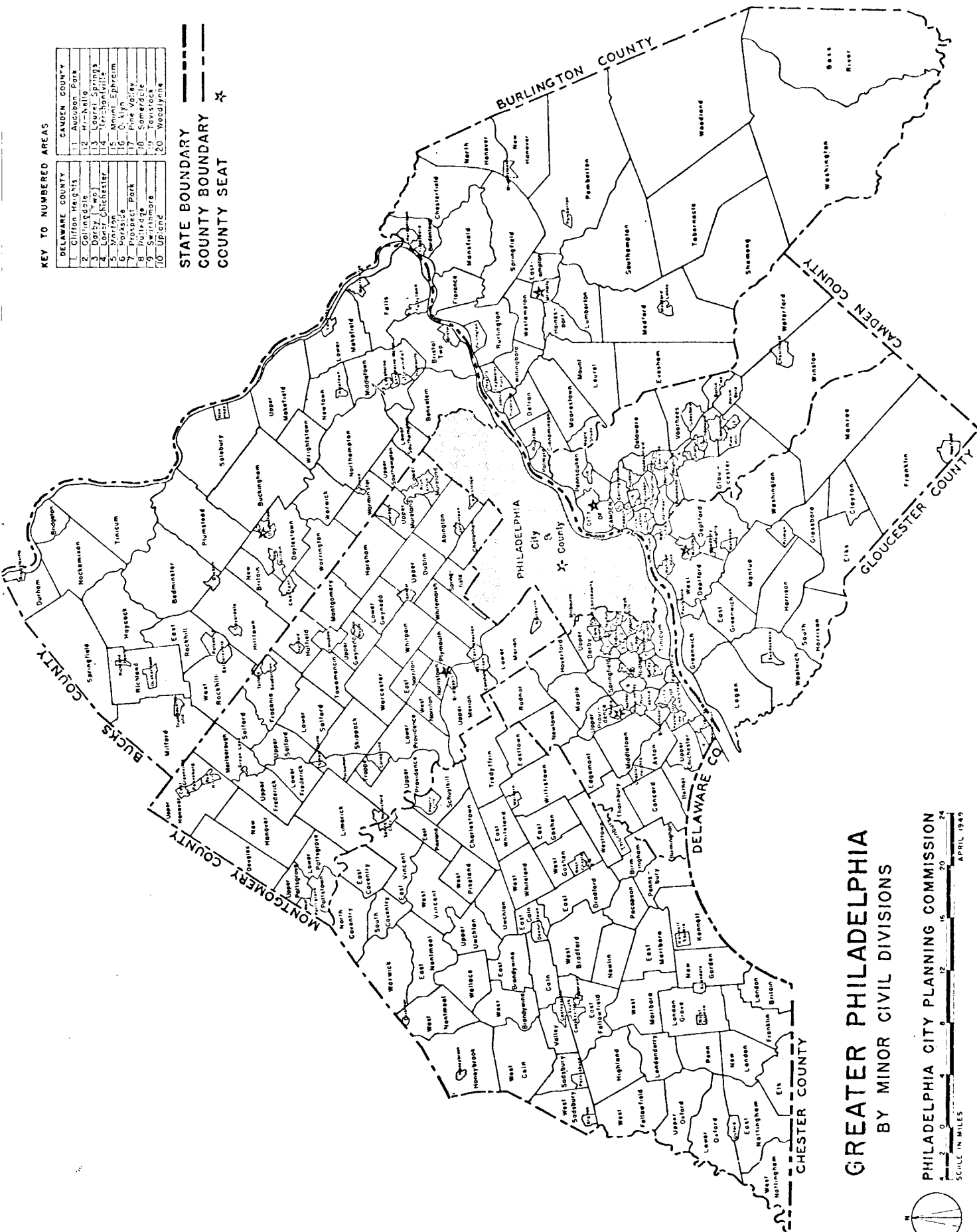
Sector (cont.)

38. Materials handling equipment
39. Special and general industry machinery and equipment
 - a) Metalworking machinery & equipment
 - b) Special industry machinery & equipment
 - c) General industrial machinery & equipment
 - d) Miscellaneous machinery
40. Office, computing & accounting machines
41. Service industry machines
42. Electric transmission and distribution equipment and other industrial apparatus
43. Household appliances
44. Electric lighting & wiring equipment
45. Communications equipment
46. Electronic components and accessories
47. Miscellaneous electrical machinery, equipment and supplies
48. Motor vehicles and equipment
49. Aircraft and parts
50. Other transportation equipment
51. Professional, scientific & controlling instruments & supplies, including watches and clocks
52. Optical and photographic equipment
53. Miscellaneous manufacturing
54. Ordnance
55. Gas & electric power & water service
56. Transportation (and warehousing)
57. Trade (including eating & drinking places)

KEY TO NUMBERED AREAS

DELAWARE COUNTY	CAMDEN COUNTY
1 Clifton Heights	1 Audubon Park
2 Collingsdale	2 H. C. Nellig
3 Darby (West)	3 Laurel Springs
4 Lower Merion	4 Trichanville
5 Norristown	5 Mount Ephraim
6 Gwynedd	6 O. K. N.
7 Prospect Park	7 Pine Valley
8 Philadelphia	8 Somerville
9 Swarthmore	9 Foxcroft
10 Upend	10 Woodbury

STATE BOUNDARY
COUNTY BOUNDARY
COUNTY SEAT



GREATER PHILADELPHIA BY MINOR CIVIL DIVISIONS

PHILADELPHIA CITY PLANNING COMMISSION

APRIL 1949



SCALE IN MILES



WHARTON SCHOOL OF FINANCE AND COMMERCE
University of Pennsylvania
REGIONAL IMPACT STUDY
Philadelphia Standard Metropolitan Area

We are requesting information for the year 1959
so as to be compatible with other sources of data
but we will accept information for any year.

The Philadelphia Standard Metropolitan Area (SMSA)
includes the Pennsylvania Counties of Philadelphia,
Bucks, Montgomery, Chester, Delaware and, in New Jer-
sey the counties of Camden, Gloucester and Burlington.

If you have any questions, please feel free to call
(collect) Dr. Gerald J. Karaska (area code 215) 594-
7737.

A - Information is for year _____.	
B - The cost of raw materials purchased as a percent of value of total sales _____%	
C - For those purchased raw materials, what percentage were in the following categories:	
a) _____	_____%
b) _____	_____%
c) _____	_____%
d) _____	_____%
e) _____	_____%
f) _____	_____%
g) _____	_____%
h) _____	_____%
i) _____	_____%
j) _____	_____%
k) _____	_____%
l) Containers & Packaging materials _____	_____%
Other (specify) _____	_____%
TOTAL OF THE ABOVE = 100%	<u>100</u> %

- For those listed materials, what percentages were purchased from vendors located in the Philadelphia S.M.S.A.:

a)	_____ %
b)	_____ %
c)	_____ %
d)	_____ %
e)	_____ %
f)	_____ %
g)	_____ %
h)	_____ %
i)	_____ %
j)	_____ %
k)	_____ %
l)	_____ %
m) Containers and Packaging Materials	_____ %

- Total percent of your products sold in the Philadelphia S.M.S.A. _____ %

- Percent of sales as prime or sub-contracts to defense related agencies* _____ %

Please check one: These data are (1) estimates _____, or (2) from actual records _____.

(signature)

te _____

c

- Defense related agencies are the Departments of Army, Navy, Air Force, and Defense, and the National Aeronautics and Space Administration.

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REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

Please report information concerning all quarrying, mining, dredging and related activities of your firm within the Philadelphia region.

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If any other year than 1959 is used, please indicate _____.

If you have any questions with regard to this questionnaire, please call: Mr. Thomas W. Langford, Department of Regional Science, (215) 594-7737.

A. PRODUCTION

1. Major products of your firm in 1959: _____

2. Was your firm in active operation nine (9) months or more of the calendar year? Yes No

3. Total value of stone, sand, gravel and other materials sold in 1959: \$ _____

B. EMPLOYMENT

1. Average annual number of employees _____

2. Total annual wages and salaries paid \$ _____

C. MATERIALS CONSUMED

1. Fuel: (a) Gasoline \$ _____
(b) Oil \$ _____
(c) Electricity \$ _____

2. Water \$ _____

3. Explosives \$ _____

4. Drill heads and bits \$ _____

5. Pneumatic hose, etc. \$ _____

6. Misc. tools and hardware \$ _____

7. Wood and metal strapping (packaging) \$ _____

8. Others (Please specify) _____ \$ _____

9. _____ \$ _____

10. _____ \$ _____

D. OTHER OPERATING EXPENSES

1. Real estate rental or lease \$ _____

2. Equipment rental or lease \$ _____

3. Insurance \$ _____

4. Telephone \$ _____

E. Major Capital Equipment Purchases? \$ _____

F. What proportion of your total production (Question A3) was used or sold to firms within the study area? (See map) _____ %

G. If you operate your own trucks, what was your total expense of their operations in 1959? \$ _____

Thank You

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REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

CONSTRUCTION ACTIVITIES

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If this questionnaire is completed for any period other than the calendar year, 1959, please indicate the year used. 19_____.

Please report information for all construction activities for the firm name appearing below.

The Philadelphia Standard Metropolitan Statistical Area (SMSA) is comprised of the counties of: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey as indicated on the attached map.

If any questions arise with regard to specific items in this questionnaire, please call: Dr. Gerald J. Karaska (215) 594-7737 or 594-7744.

A. Number of Employees for year: 19_____

Average_____ Highest_____ Lowest_____

B. Wages and Salaries paid for year: _____

C. Dollar volume of construction work for year:

Contracts received [] Contracts Completed [] \$_____

Estimate of construction work done for year: \$_____

Percent of work in Bucks County _____%

Percent of work Outside Philadelphia SMSA _____%

Percent of Work which was repair or replacement _____%

D. VALUE OF MATERIAL PURCHASES - If data are not available, please use your best estimate.

[illegible]

Please use additional schedules, if required.

E. Value of Sub-Contracts \$ _____

<u>Trades Covered by sub contracts</u>	<u>Value</u>	<u>Percent of total trade by local sub-contractors</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

F. EQUIPMENT EXPENDITURES

Dollar value of equipment purchases \$ _____

Depreciation allowance for existing equipment \$ _____

Rent paid for equipment \$ _____

Value of purchased parts, etc. \$ _____

Costs of maintenance and repairs (except parts) \$ _____

Costs of fuels, lubes, etc. \$ _____

Other. \$ _____

G. Other operating expenses

Office supplies	\$ _____	Interest paid	\$ _____
Electricity, gas, oil, heat	\$ _____	Insurance	\$ _____
Rent (land & buildings only)	\$ _____	Bonding Charges	\$ _____
Business & Professional Services	\$ _____	Taxes	\$ _____
Advertising	\$ _____	Other	\$ _____

H. Contracting Agency or Client

Percent of total
construction businessPercent of construction
within Region

Government

Federal	_____ %	_____ %
State	_____ %	_____ %
Local	_____ %	_____ %
Industrial	_____ %	_____ %
Residential	_____ %	_____ %
Commercial	_____ %	_____ %

I. Receipts from non-construction activities

Equipment lease or rental		\$ _____
Real estate rental or sale		\$ _____
Material & services you provided and/or sold to other firms	*	\$ _____
Other.	*	\$ _____

* Please outline the nature of the starred other activities below.

REGIONAL IMPACT STUDY

Wharton School of Finance and Commerce
University of Pennsylvania

HOME BUILDERS, DEVELOPERS, AND SUBDIVIDERS

Information is requested for the calendar year 1959. If it is not possible to provide data for 1959, please use the nearest available year. If this questionnaire is completed for any period other than the calendar year, 1959, please indicate the year used. 19_____.

Please report information for all construction activities for the firm name appearing below.

The Philadelphia Standard Metropolitan Statistical Area (SMSA) is comprised of the counties of: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden and Gloucester in New Jersey as indicated on the attached map.

If any questions arise with regard to specific items in this questionnaire, please call: Dr. Gerald J. Karaska (215) 594-7737 or 594-7744.

A. Number of Employees for year: 19_____

Average_____ Highest_____ Lowest_____

B. Wages and Salaries paid for year: _____

C. Dollar volume of construction work for year:

1. Estimated value of construction work put in place during the year

\$ _____

2. Estimated value of real property (land and improvements) sold

\$ _____

3. Percent of work in Bucks County _____%

4. Percent of work Outside Philadelphia SMSA _____%

5. Percent of Work which was repair or replacement _____%

D. VALUE OF MATERIAL PURCHASES - If data are not available, please use your best estimate.

Please use additional schedules, if required.

E. Value of Sub-Contracts \$ _____

<u>Trades Covered by sub contracts</u>	<u>Value</u>	<u>Percent of total trade by local sub-contractors</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

F. EQUIPMENT EXPENDITURES

Dollar value of equipment purchases \$ _____

Depreciation allowance for existing equipment \$ _____

Rent paid for equipment \$ _____

Value of purchased parts, etc. \$ _____

Costs of maintenance and repairs (except parts) \$ _____

Costs of fuels, lubes, etc. \$ _____

Other. \$ _____

G. Other Operating Expenses

Office Supplies	\$ _____	Interest paid	\$ _____
Electricity, gas, oil, heat	\$ _____	Insurance	\$ _____
Rent (land & Buildings Only)	\$ _____	Bonding Charges	\$ _____
Business & Professional Service	\$ _____	Municipal Fees and Service Charges	\$ _____
Advertising	\$ _____	Others	\$ _____

H. Receipts from Non-Construction Activities

1. Value of Land Sold or Leased (Exclusive of Buildings) \$ _____
2. Equipment Lease or Rental \$ _____
3. Materials or services you provided and/or sold to
other firms (*) \$ _____
4. Others (*) \$ _____

I. Number of lots created during the year _____

Number of dwelling units built during the year _____

J. Road and Utility Construction

Of your total construction work done (Question C)
What percentage or dollar value is represented by the following:

- (1) Roads, highways, and public rights of way deeded to governments

- (2) Sewer, water, gas and other utility mains, trunks, etc. (exclude
on-site and small private systems)

- (3) Public buildings, structures, open spaces and other facilities
deeded to governments or special district authorities

- (4) Others, (please specify) _____

(*) Please outline the nature of the starred other activities on the reverse
side.

INSTRUCTIONS

REGIONAL IMPACT STUDY
University of PennsylvaniaCONSTRUCTION ACTIVITIES

We have attempted to keep the accompanying questionnaire short and simple as possible. Most of the definitions below are those commonly used either by the U.S. Bureau of the Census or in common usage within the trade.

If data are not available in the form requested, please estimate the values rather than leave the question blank.

A. Average Annual Employment

This represents the average of all full time and part time employees on the payrolls of the establishment who worked or received pay for any part of the pay period ending nearest the 15th of the months of March, May, August and November. Included are all persons on paid sick leave, paid holidays, and paid vacations during these periods. Excluded are members of the armed forces and pensioners carried on the active rolls but not working during the period. Officers of corporations are included as employees; however, proprietors and partners of unincorporated firms are excluded.

The lowest number of employees for the year represents the total of full time employees paid during the slack periods whether they are actively engaged in construction or not.

B. Total Annual Wages and Salaries

This total includes the gross earnings paid during the calendar year to all employees on the payroll of the establishment as described above. This includes commissions, dismissal pay, all bonuses, vacation and sick leave pay, and compensation in kind. You may use the information from census returns or federal withholding tax reports.

C. Dollar Volume of Construction Work

Estimate of construction work done for the year represents the value of construction work put in place during the calendar year. This value is intended to represent the value of work installed or erected on the site for all buildings and other structures under construction during the given year, regardless of when the work on each individual active project was started or completed.

This value represents a summation of the cost of materials actually used or consumed during the period, regardless of when the materials were purchased or delivered to the site; the cost of labor performed during the period; and the proportionate allowances for overhead costs, profit on construction operations, and the cost of architectural and engineering services, if applicable.

The requested three percentage figures are to be calculated using the construction work done as the base value. Repair or replacement covers all structural changes or modifications which do not result in the creation of significant additional floor space, but including the installation of new or improved service facilities and utilities in existing building or structures other than buildings. Highway repair or replacement includes structural changes, enlargements and all maintenance repairs; but exclude the creation of new structures either on new or existing right-of-ways.

D. Purchases

Please include in this schedule the products purchased in construction operations of your firm. The classification of products may be found on the supplementary sheets (green). If any category of products accounts for 5% or more of your total purchases and does not appear on the classification sheet, please indicate, using the reverse side of the schedule for a description of the group. Costs of purchases should be the amounts paid (after discounts and allowances) for goods and products. These prices should include freight charges if possible. (If freight charges are excluded or if you pick up in your own trucks, please note).

If any problem arises in the classification of products please call the study offices.

Origin of Purchasers:

Manufacturers Those establishments primarily engaged in the production or manufacture of goods and products.

Wholesalers Those non-manufacturing establishments engaged in selling goods to retail and wholesale trading establishments, or to industrial, commercial, institutional and professional users.

Others Establishments from which you purchase, and you not believe that they fall into either of the two above categories. Please describe these firms in detail.

(NOTE: The percentages in each of the rows should add to 100%).

E. Value of Sub-Contracts

This represents the total value of sub-contracts let by your firm to other firms for construction work done by them during the period reported. That is, your estimate of the value of work put in place by the sub-contractor.

Please indicate the total for each Trade or Section of contract specifications, the total amount of work put in place by the various sub-contractors.

(NOTE: This excludes the value of work done by your firm within any of these trades or sections).

Local sub-contractors are those who's headquarters are within the Philadelphia Standard Metropolitan Statistical Area, as shown on the attached map.

F. Equipment Expenditures

Equipment purchases are defined as those capital expenditures which are depreciable under the current tax codes. This refers only to equipment, and specifically excludes purchases of land, buildings and other real property.

Depreciation allowance is the reasonable allowance permitted by law for the exhaustion or wear and tear of equipment used in your construction activities.

Rent paid for equipment is the value of the lease or rental agreement for equipment used in construction activities during the reporting period which is owned by other companies.

Costs of maintenance and repairs (except parts) includes labor cost. Please indicate if these labor costs are also included in question B, page 1.

G. Other Operating Expenses

Rent (land and buildings only) refers to rents paid or accrued for business properties in which you have no equity.

Business and Professional Services includes fees and retainers paid to firms and individuals providing business or professional services, such as accounting, auditing, engineering, legal, etc.

Insurance expense includes premiums paid for business related insurance, but specifically excludes insurance payments for unemployment compensation, hospitalization, life insurance, and other insurance programs for employees.

Taxes include all tax payments made to federal, state and local taxing agencies, excluding specific service charges.

H. Contracting Agency or Client

This question refers to the breakdown of your clients and their share of your total value of construction put in place during the reporting period. (See question C, page 1). (NOTE: The sum of the first column should add to 100%).

I. Receipts from Non-Construction Activities

These receipts are in addition to those reported in question C, and represent business income incidental to your construction operations.

Please provide for the starred (*) items a general description of the types of materials or services produced by your firm and sold to others. (i.e., cement block, gravel, engineering services).

If there are any questions concerning this report, please feel free to call: Dr. Gerald Karaska, University of Pennsylvania (Area Code 215) 594-7737 or 594-7744.

THANK YOU FOR YOUR COOPERATION.

UNIVERSITY of PENNSYLVANIA

PHILADELPHIA 19104

*Wharton School of
Finance and Commerce*
Regional Impact Study

We recently received a completed questionnaire on your company and wish to express our sincere appreciation for the time and effort expended by you in completing this form.

The success of our study in large part reflects the cooperation of many firms in the Philadelphia region (and much of its success is already insured by the response from your firm).

The detail reported by you permits us to gain valuable insights to the functioning of the Philadelphia economy.

Please rest assured that this information will be kept in strictest confidence, no data will be published so as to identify individual firms.

Thank you again for your cooperation.

Sincerely yours,

Walter Isard, Professor
Economics and Regional
Science

WI/cva

EMPLOYMENT IN EDITED ESTABLISHMENTS, COVERAGE AND RANGE OF SIZE
OF STATISTICAL ESTABLISHMENTS ADDED TO INDUSTRY DATA,
MANUFACTURING INDUSTRIES, 4-DIGIT SIC

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
20	59	20,993	18	2,259	77	23,252	9.99	44.15	
2011	5	1,542	3	579	8	2,121	12.31	55.21	
2013	2	556	2	84	4	640	6.67	25.53	
2015	2	134	-	-	2	134	18.18	42.54	
2021	1	42	1	3	2	45	100.00	57.69	Agg. RIS 2020
2022	1	46	-	-	1	46	50.00	83.64	Agg. RIS 2020
2024	3	264	1	25	4	289	23.53	14.74	
2025	-	-	-	-	-	-			Agg. RIS 2090
2026	9	2,878	4	136	13	3,014	14.77	42.49	
2031	-	-	-	-	-	-	0.0	0.0	g
2032	1	4,150	-	-	1	4,150	33.33	89.94	c
2033	4	755	-	-	4	755	12.90	41.78	c
2035	2	172	-	-	2	172	10.53	47.38	
2036	1	244	-	-	1	244	14.28	106.08	d
2037	1	65	-	-	1	65	8.33	9.06	d
2041	-	-	-	-	-	-	0.0	0.0	g
2042	4	182	-	-	4	182	15.38	32.04	
2043	-	-	-	-	-	-	0.0	0.0	g
2045	-	-	-	-	-	-	0.0	0.0	g
2046	-	-	-	-	-	-	0.0	0.0	g
2051	2	761	2	1,140	4	1,901	2.45	17.72	
2052	3	2,758	-	-	3	2,758	15.00	96.64	
2062	1	1,192	-	-	1	1,192	50.00	59.87	d
2071	2	1,678	3	253	5	1,931	7.04	49.12	
2072	2	72	-	-	2	72	50.00	11.84	
2073	1	336	-	-	1	336	33.33	58.03	c
2082	1	1,253	-	-	1	1,253	16.67	69.15	c
2084	1	85	-	-	1	85	50.00	89.47	b
2085	1	1,280	-	-	1	1,280	12.50	92.22	c
2086	-	-	-	-	-	-	0.0	0.0	g
2087	2	68	2	39	4	107	21.05	16.61	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
2093	-	-	-	-	-	-	0.0	0.0	Agg. RIS 2090
2094	2	140	-	-	2	140	16.67	24.91	
2095	1	45	-	-	1	45	50.00	100.00	b
2096	1	58	-	-	1	58	100.00	100.00	
2097	-	-	-	-	-	-	0.0	0.0	g
2098	-	-	-	-	-	-	0.0	0.0	Agg. RIS 2090
2099	3	237	-	-	3	237	8.11	27.91	Agg. RIS 2090
21	1	7	-	-	1	7	5.00	0.16	
2111	-	-	-	-	-	-	0.0	0.0	g
2121	1	7	-	-	1	7	5.55	0.17	b
2131	-	-	-	-	-	-	0.0	0.0	g
22	73	8,121	25	1,672	98	9,793	20.00	26.38	
2211	2	73	-	-	2	73	11.76	6.15	d
2221	3	248	1	35	4	283	30.77	25.38	
2231	7	1,199	2	57	9	1,256	28.12	42.67	
2241	5	468	3	207	8	675	22.86	39.75	
2251	5	204	1	64	6	268	9.09	20.13	
2252	5	208	3	160	8	368	24.24	25.19	
2253	3	1,221	6	474	9	1,695	11.25	17.01	
2254	2	105	1	155	3	260	27.27	15.07	
2256	4	249	-	-	4	249	18.18	18.40	
2259	2	109	-	-	2	109	33.33	35.16	d
2261	4	258	1	12	5	270	35.71	24.75	
2262	1	15	-	-	1	15	33.33	16.85	
2269	5	438	3	92	8	530	33.33	31.30	
2271	2	432	1	253	3	685	30.00	35.47	
2272	1	26	-	-	1	26	20.00	2.91	f
2279	1	50	-	-	1	50	9.09	15.29	
2281	1	164	-	-	1	164	20.00	65.34	d
2282	3	359	-	-	3	359	15.79	25.32	
2283	3	715	2	138	5	853	23.81	37.59	
2284	3	113	-	-	3	113	60.00	43.46	

Edited Survey Establishments									Size of Statist. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
2291	2	205	-	-	2	295	33.33	46.17	b
2292	1	89	-	-	1	89	14.28	11.98	b
2293	2	100	1	25	3	125	25.00	27.06	
2294	3	53	-	-	3	53	27.27	29.44	
2295	-	-	-	-	-	-	0.0	0.0	g
2297	2	574	-	-	2	574	20.00	53.59	
2298	-	-	-	-	-	-	0.0	0.0	g
2299	1	446	-	-	1	446	14.28	83.05	b
23	91	13,668	32	3,093	123	16,761	12.20	28.74	
2311	5	3,790	5	1,424	10	5,214	6.94	28.89	
2321	4	657	1	17	5	674	27.78	55.56	
2322	2	48	-	-	2	48	66.67	106.67	
2323	2	82	-	-	2	82	10.00	19.95	
2327	4	447	3	155	7	602	12.73	20.22	
2328	3	176	2	112	5	288	25.00	31.34	
2329	5	601	1	66	6	667	14.63	25.68	
2331	4	715	5	306	9	1,021	19.56	35.79	
2335	8	1,671	-	-	8	1,671	5.97	24.42	
2337	5	244	1	60	6	304	11.54	14.16	
2339	1	40	1	100	2	140	4.54	5.47	b
2341	3	224	2	131	5	355	26.31	28.79	
2342	-	-	-	-	-	-	0.0	0.0	g
2351	2	75	1	55	3	130	18.75	27.48	
2352	3	1,760	1	12	4	1,772	20.00	87.72	
2361	2	945	2	185	4	1,130	9.52	27.66	
2363	2	93	1	85	3	178	14.28	16.73	
2369	3	187	-	-	3	187	8.11	18.85	
2371	2	43	-	-	2	43	13.33	54.43	
2381	-	-	-	-	-	-	0.0	0.0	g
2384	2	53	-	-	2	53	33.33	19.92	
2385	1	60	-	-	1	60	33.33	26.31	d
2386	1	85	-	-	1	85	100.00	52.15	d
2387	1	38	1	50	2	88	14.28	11.69	
2389	3	276	-	-	3	276	29.00	67.32	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
2391	3	183	2	240	5	423	13.89	48.07	
2392	5	177	-	-	5	177	11.63	17.54	
2393	2	218	-	-	2	218	33.33	87.90	
2394	2	75	2	85	4	160	13.79	46.11	
2395	3	186	-	-	3	186	8.57	40.09	
2396	3	152	1	10	4	162	16.00	13.88	
2397	3	135	-	-	3	135	60.00	70.31	
2399	2	232	-	-	2	232	5.71	17.51	b
24	16	813	6	260	22	1,073	11.05	33.76	
2411	-	-	-	-	-	-	0.0	0.0	Agg. RIS 2490
2421	1	13	-	-	1	13	2.86	8.23	d
2431	4	254	1	60	5	314	8.20	26.45	
2433	2	195	1	15	3	210	50.00	51.85	
2441	3	109	1	75	4	184	23.53	40.26	
2442	-	-	-	-	-	-	0.0	0.0	Agg. RIS 2490
2443	1	55	1	30	2	85	50.00	80.95	b
2445	1	5	-	-	1	5	33.33	10.87	c
2491	-	-	-	-	-	-	0.0	0.0	Agg. RIS 2490
2499	4	182	2	80	6	262	11.11	43.59	
25	34	2,552	5	254	39	2,806	14.61	39.19	
2511	7	134	1	26	8	160	22.22	26.94	
2512	3	120	-	-	3	120	5.36	15.52	
2514	4	777	1	45	5	822	20.00	46.36	
2515	2	165	1	4	3	169	9.37	24.71	
2519	-	-	-	-	-	-	0.0	0.0	g
2521	2	106	-	-	2	106	33.33	50.96	
2522	2	262	-	-	2	262	15.38	29.74	b
2531	4	212	-	-	4	212	50.00	81.85	
2541	4	316	1	28	5	344	12.50	47.91	
2542	3	313	1	151	4	464	75.00	67.45	
2591	2	87	-	-	2	87	12.50	52.09	
2599	1	60	-	-	1	60	16.67	98.36	d

SIC	Edited Survey Establishments						Survey Coverage		Size of Statis. Estab. and Agg. Notes
	Complete		Partially Complete		Total				
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
26	32	8,711	11	1,727	43	10,438	18.45	47.68	
2621	2	2,750	2	773	4	3,523	36.36	91.10	
2631	3	1,995	1	100	4	2,095	36.36	71.14	
2641	3	293	-	-	3	293	16.67	24.44	
2642	3	539	-	-	3	539	37.50	81.54	
2643	2	293	2	80	4	373	40.00	44.04	
2644	-	-	-	-	-	-	0.0	0.0	Agg. RIS 2640
2645	3	139	1	61	4	200	26.67	36.10	
2649	2	239	1	65	3	304	7.50	10.42	Agg. RIS 2690
2651	3	462	2	134	5	596	16.67	25.35	
2652	2	255	-	-	2	255	5.88	17.23	
2653	5	1,442	1	500	6	1,942	18.18	48.59	
2654	2	209	1	14	3	223	60.00	53.60	
2655	2	95	-	-	2	95	15.38	20.70	b
2661	-	-	-	-	-	-	0.0	0.0	g
27	57	17,494	18	952	75	18,446	7.52	44.88	
2711	4	2,857	3	71	7	2,928	6.54	35.25	d
2721	3	10,465	-	-	3	10,465	8.11	84.74	
2731	3	345	1	4	4	349	14.28	18.80	
2732	3	186	-	-	3	186	8.11	20.94	
2741	2	36	1	30	3	66	8.57	16.79	
2751	6	546	3	465	9	1,011	2.17	15.77	
2752	9	1,023	1	60	10	1,083	7.35	25.48	
2753	2	81	2	20	4	101	23.53	14.14	
2761	2	140	1	200	3	340	12.00	35.34	
2771	2	151	1	41	3	192	37.50	62.13	
2782	5	60	1	5	6	65	31.58	14.94	
2789	5	579	1	15	6	594	13.04	40.00	

Edited Survey Establishments									Size of Statist. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
2791	5	711	1	13	6	724	13.04	50.63	
2793	3	106	1	25	4	131	13.33	14.49	
2794	1	160	1	3	2	163	18.18	44.05	e
2799	2	48	-	-	2	48	100.00	120.00	
28	44	7,399	20	12,908	64	20,307	14.93	59.62	
2813	1	100	2	264	3	364	16.67	49.59	a
2814	1	986	-	-	1	986	25.00	95.82	b
2815	1	25	-	-	1	25	25.00	12.19	b
2816	2	144	-	-	2	144	33.33	24.04	
2818	2	60	-	-	2	60	28.56	5.42	b
2819	3	392	3	2,368	6	2,760	20.00	71.35	
2821	4	1,916	5	5,202	9	7,118	36.60	76.25	
2831	1	7	-	-	1	7	25.00	17.95	Agg. RIS 2830
2834	3	1,255	2	4,599	5	5,854	8.77	80.74	Agg. RIS 2830
2841	3	592	-	-	3	592	11.54	49.17	
2842	2	620	2	19	4	639	10.81	81.19	a
2843	1	38	1	62	2	100	13.33	27.62	a
2844	4	18	-	-	4	18	21.05	7.59	
2851	2	195	1	6	3	201	4.41	5.49	
2852	1	24	-	-	1	24	33.33	28.57	b
2861	-	-	-	-	-	-	0.0	0.0	
2871	1	4	-	-	1	4	25.00	1.23	c
2873	2	14	-	-	2	14	33.33	2.59	Agg. RIS 2870
2879									
2891	4	337	-	-	4	337	22.22	65.18	
2892	1	25	-	-	1	25	5.55	1.48	b
2893	1	200	2	140	3	340	14.28	47.62	b
2894	2	157	-	-	2	157	100.00	100.00	
2895	-	-	-	-	-	-	0.0	0.0	g
2899	2	290	2	248	4	538	8.89	45.94	
29	12	11,477	-	-	12	11,477	23.53	72.63	
2911	3	10,766	-	-	3	10,766	25.00	77.83	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
2951	3	148	-	-	3	148	17.65	74.00	
2952	1	30	-	-	1	30	25.00	37.97	c
2992	5	533	-	-	5	533	27.78	31.54	
30	17	4,415	5	3,348	22	7,763	14.57	60.78	
3011	1	1,160	1	2,891	2	4,051	66.67	76.10	a
3021	1	174	-	-	1	174	100.00	100.00	c
3031	1	31	-	-	1	31	100.00	86.11	b
3069	7	1,820	-	-	7	1,820	17.50	52.86	
3079	7	1,230	4	457	11	1,687	10.38	44.43	
31	22	2,238	2	52	24	2,290	22.22	36.05	
3111	3	1,201	-	-	3	1,201	14.28	54.59	
3121	2	155	-	-	2	155	33.33	49.52	
3131	2	86	-	-	2	86	25.00	34.26	
3141	3	417	-	-	3	417	18.75	23.14	
3142	1	70	1	12	2	82	40.00	32.67	b
3161	4	122	-	-	4	122	15.38	27.23	
3171	3	134	1	40	4	174	50.00	32.34	
3172	2	22	-	-	2	22	25.00	5.36	
3199	2	31	-	-	2	31	20.00	22.30	
32	51	5,717	13	2,775	64	8,492	19.63	58.54	
3211	1	155	-	-	1	155	100.00	100.00	c
3221	2	285	-	-	2	285	66.67	101.06	b
3229	2	130	-	-	2	130	28.56	114.03	b
3231	2	254	3	269	5	523	10.87	45.40	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
3241	-	-	-	-	-	-	0.0	0.0	
3251	2	97	-	-	2	97	40.00	46.11	
3253	1	410	1	997	2	1,407	50.00	99.43	
3255	2	310	-	-	2	310	40.00	94.22	
3259	3	206	-	-	3	206	75.00	86.92	
3261	-	-	-	-	-	-	0.0	0.0	g
3269	3	40	2	59	5	99	33.33	41.25	
3271	3	228	1	46	4	274	12.53	57.08	
3272	2	250	3	114	5	364	10.87	43.64	
3273	6	435	-	-	6	435	11.76	32.01	
3274	1	310	-	-	1	310	100.00	100.00	b
3275	2	405	-	-	2	405	66.67	98.78	a
3281	2	77	-	-	2	77	10.00	29.39	
3291	3	782	-	-	3	782	15.79	55.62	
3292	4	424	2	1,040	6	1,464	85.71	99.05	
3293	1	96	1	250	2	346	9.52	21.77	
3295	3	112	-	-	3	112	23.08	29.71	
3296	1	525	-	-	1	525	50.00	91.30	c
3297	2	119	-	-	2	119	25.00	17.65	
3299	3	67	-	-	3	67	27.27	37.43	
33	40	13,597	10	8,884	50	22,481	24.63	60.71	
3312	2	5,034	3	8,521	5	13,555	45.45	69.14	c
3315	2	133	1	40	3	173	50.00	36.34	
3316	2	279	-	-	2	279	66.67	71.17	
3317	2	268	-	-	2	268	20.00	19.21	
3321	4	1,567	3	143	7	1,710	21.21	43.67	
3323	2	1,417	-	-	2	1,417	20.00	65.48	
3331	-	-	-	-	-	-	0.0	0.0	Agg. RIS 3330
3333	-	-	-	-	-	-	0.0	0.0	g
3334	-	-	-	-	-	-	0.0	0.0	g
3339	2	21	-	-	2	21	66.67	60.00	Agg. RIS 3330
3341	5	330	-	-	5	330	22.73	28.45	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
Complete		Partially Complete		Total		Survey Coverage			
Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.		
3351	1	480	-	-	1	480	25.00	152.13	e
3352	1	32	-	-	1	32	29.00	14.35	b
3356	3	1,520	-	-	3	1,520	60.00	98.38	
3357	1	6	-	-	1	6	33.33	3.00	c
3361	3	1,000	-	-	3	1,000	14.28	58.14	
3362	3	87	1	15	4	102	16.00	21.16	
3369	1	350	-	-	1	350	11.11	43.80	c
3391	3	519	2	165	5	675	62.50	42.27	
3392	-	-	-	-	-	-	0.0	0.0	Agg. RIS 3390
3399	3	563	-	-	3	563	15.79	82.79	Agg. RIS 3390
34	92	14,325	25	1,648	117	15,973	12.55	36.46	
3411	2	1,842	1	38	3	1,880	33.33	63.00	
3421	1	24	-	-	1	24	33.33	33.33	c
3423	4	133	1	46	5	179	16.67	14.92	
3425	-	-	-	-	-	-	0.0	0.0	g
3429	6	450	-	-	6	450	16.22	39.47	
3431	-	-	-	-	-	-	0.0	0.0	g
3432	3	17	-	-	3	17	33.33	10.62	
3433	3	947	-	-	3	947	9.68	38.32	
3441	2	516	1	170	3	686	4.90	15.40	b
3442	4	916	1	5	5	921	8.20	39.39	
3443	2	825	2	92	4	917	8.69	25.89	
3444	6	310	3	217	9	527	5.70	14.69	
3449	9	209	1	6	10	215	12.19	21.78	
3451	5	106	1	32	6	138	12.00	20.47	
3452	3	3,360	1	110	4	3,470	17.39	78.86	
3461	5	758	1	460	6	1,218	7.69	24.91	
3471	4	185	-	-	4	185	7.14	23.63	
3479	2	179	3	148	5	327	17.86	55.33	
3481	5	211	4	139	9	350	13.33	19.61	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
3491	4	347	1	26	5	373	55.55	55.01	
3493	4	392	-	-	4	392	40.00	21.98	
3494	4	1,676	-	-	4	1,676	10.26	56.35	
3496	1	374	-	-	1	374	100.00	100.00	b
3497	-	-	-	-	-	-	0.0	0.0	g
3498	2	76	1	125	3	201	27.27	48.55	
3499	11	472	3	34	14	506	42.42	84.33	
35	117	28,302	21	1,125	138	29,427	17.47	61.40	
3511	1	7,630	-	-	1	7,630	50.00	81.47	Agg. RIS 3510
3519	-	-	-	-	-	-	0.0	0.0	Agg. RIS 3510
3522	3	86	-	-	3	86	25.00	22.81	
3531	2	161	-	-	2	161	50.00	121.97	
3532	-	-	-	-	-	-	0.0	0.0	Agg. RIS 3590
3534	2	359	-	-	2	359	33.33	94.22	
3535	3	803	-	-	3	803	25.00	92.30	
3536	2	64	-	-	2	64	33.33	41.83	
3537	1	2,646	-	-	1	2,646	11.11	91.15	a
3541	6	130	1	90	7	220	35.00	36.24	
3542	4	49	-	-	4	49	40.00	36.30	
3544	10	214	5	151	15	365	8.74	18.79	
3545	2	57	-	-	2	57	14.28	45.97	
3548	-	-	-	-	-	-	0.0	0.0	g
3551	3	817	-	-	3	817	15.79	71.17	
3552	5	946	1	130	6	1,076	15.00	36.97	
3553	-	-	-	-	-	-	0.0	0.0	g
3554	2	904	2	294	4	1,198	18.18	62.89	
3555	5	379	-	-	5	379	22.73	37.67	
3559	3	886	2	90	5	976	14.28	42.81	
3561	3	614	-	-	3	614	15.00	60.31	
3562	3	3,455	-	-	3	3,455	30.00	73.07	
3564	-	-	-	-	-	-	0.0	0.0	g
3565	3	44	2	80	5	124	13.89	50.41	
3566	8	2,253	-	-	8	2,253	42.10	85.96	
3567	4	751	1	65	5	816	45.45	104.08	
3569	3	846	3	95	6	941	33.33	50.29	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
3571	2	1,312	-	-	2	1,312	28.56	43.16	c
3576	3	84	-	-	3	84	60.00	81.55	
3579	2	200	-	-	2	200	40.00	83.68	
3581	3	234	-	-	3	234	75.00	92.12	
3582	-	-	-	-	-	-	0.0	0.0	g
3585	4	1,167	-	-	4	1,167	16.00	53.51	
3586	2	167	-	-	2	167	33.33	43.26	
3589	8	349	-	-	8	349	80.00	68.16	
3591	13	598	3	45	16	643	9.30	23.67	
3599	2	97	1	85	3	182	60.00	22.25	Agg. RIS 3590
36	49	31,322	15	7,134	64	38,456	19.15	68.11	
3611	3	496	1	45	4	541	10.53	47.88	
3612	3	268	1	90	4	358	44.44	80.63	
3613	4	8,284	1	423	5	8,707	23.81	95.37	
3621	2	333	-	-	2	333	18.18	22.02	
3622	2	164	1	25	3	189	60.00	180.00	
3623	1	200	-	-	1	200	25.00	43.76	d
3624	-	-	-	-	-	-	0.0	0.0	
3629	1	130	-	-	1	130	25.00	40.26	c
3631	-	-	-	-	-	-	0.0	0.0	g
3633	-	-	-	-	-	-	0.0	0.0	g
3634	2	255	-	-	2	255	28.56	88.85	
3635	-	-	-	-	-	-	0.0	0.0	g
3639	2	392	1	10	3	402	42.84	82.55	
3641	-	-	-	-	-	-	0.0	0.0	Agg. RIS 3690
3642	3	871	1	35	4	906	5.33	23.54	
3643	4	203	-	-	4	203	28.56	36.91	
3644	3	640	1	878	4	1,518	21.05	89.19	
3651	1	43	-	-	1	43	14.28	1.24	e
3652	1	43	1	50	2	93	40.00	52.25	
3661	2	22	-	-	2	22	100.00	95.65	
3662	4	16,343	4	5,229	8	21,572	47.06	97.88	
3671	-	-	-	-	-	-	0.0	0.0	g
3672	2	58	-	-	2	58	50.00	49.15	
3679	5	2,118	2	321	7	2,439	16.28	50.99	

SIC	Edited Survey Establishments								Size of Statis. Estab. and Agg. Notes
	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
3691	1	300	-	-	1	300	20.00	21.83	d
3693	1	50	-	-	1	50	33.33	83.33	c
3694	1	90	1	28	2	118	40.00	25.65	Agg. RIS 3690
3699	-	-	-	-	-	-	0.0	0.0	Agg. RIS 3690
37	20	35,464	6	1,987	26	37,451	24.07	88.93	
3711	1	573	1	1,530	2	2,103	66.67	99.95	a
3713	2	40	-	-	2	40	10.53	14.13	
3714	4	4,302	-	-	4	4,302	10.53	21.05	
3715	1	200	-	-	1	200	33.33	23.50	f
3721	2	9,015	2	310	4	9,325	100.00	372.11	a
3722	3	1,325	-	-	3	1,325	50.00	86.04	
3729	2	5,181	1	105	3	5,286	12.00	70.91	
3731	2	13,348	1	30	3	13,378	33.33	96.59	
3732	-	-	1	12	1	12	9.09	9.45	e
3741	1	1,426	-	-	1	1,426	100.00	100.00	b
3791	-	-	-	-	-	-	0.0	0.0	g
3794	2	54	-	-	2	54	33.33	46.96	
38	29	5,652	10	2,073	39	7,725	25.00	56.42	
3811	5	173	2	80	7	253	29.17	26.94	
3821	5	4,173	2	1,496	7	5,669	17.95	54.35	
3822	3	161	-	-	3	161	60.00	121.98	
3831	2	84	2	70	4	154	50.00	82.79	
3841	2	178	-	-	2	178	21.00	81.28	
3842	5	320	2	194	7	514	31.82	96.80	
3843	4	493	1	227	5	720	23.81	80.00	
3851	-	-	1	6	1	6	14.28	12.00	Agg. RIS 3999
3861	3	70	-	-	3	70	15.00	23.03	
39	59	2,535	4	590	63	3,125	14.45	30.14	

Edited Survey Establishments									Size of Statis. Estab. and Agg. Notes
SIC	Complete		Partially Complete		Total		Survey Coverage		
	Est.	Empl.	Est.	Empl.	Est.	Empl.	Est.	Empl.	
3911	3	87	-	-	3	87	30.85	6.67	Agg. RIS 3999
3912	-	-	-	-	-	-	0.0	0.0	
3913	2	3	-	-	2	3	33.33	37.50	
3914	2	62	-	-	2	62	33.33	91.18	
3931	1	10	-	-	1	10	25.00	2.33	d
3941	3	90	1	250	4	340	16.00	32.69	Agg. RIS 3999
3942	3	45	-	-	3	45	37.50	14.61	
3949	4	259	-	-	4	259	14.81	29.26	
3951	2	556	-	-	2	556	100.00	100.00	
3952	-	-	-	-	-	-	0.0	0.0	c
3953	5	41	-	-	5	41	18.52	11.08	g
3955	3	220	-	-	3	220	37.50	94.42	
3961	3	29	-	-	3	29	42.84	37.18	Agg. RIS 3999
3962	3	110	-	-	3	110	27.27	33.85	
3963	-	-	-	-	-	-	0.0	0.0	
3964	1	8	-	-	1	8	25.00	3.52	
3981	6	152	-	-	6	152	24.00	32.83	Agg. RIS 3999
3982	2	180	-	-	2	180	66.67	18.42	
3984	-	-	-	-	-	-	0.0	0.0	
3987	4	117	1	115	5	232	15.15	44.61	
3988	2	99	-	-	2	99	11.76	34.26	
3992	2	16	-	-	2	16	100.00	100.00	Agg. RIS 3999
3993	3	160	-	-	3	160	3.33	10.97	
3995	2	102	-	-	2	102	40.00	30.09	
3999	3	189	2	225	5	414	7.14	39.69	

APPENDIX B - 3

RIS Sector Input Code	A - Type Returns		B - Type Returns	Sum Inputs	A inputs A output		A + B inputs A + B output	
	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
2084	204,500	91,422	66,230	362,152	.109696	.110289		
2085	550,350	265,750	187,500	1,003,600	.303991	.305635		
2086	71,500	30,155	18,290	119,945	.036332	.036528		
2087	30,500	16,213	7,000	53,713	.016270	.016358		
2097	10,400	8,951	3,650	23,001	.006967	.007005		
2621	19,750	11,258	-	31,008	.009392	.009443		
3229	58,500	31,100	18,420	108,020	.032719	.032896		
39999	15,200	4,330	10,695	30,225	.009155	.009204		
				<u>1,731,664</u>	<u>.524522</u>	<u>.527358</u>		
2M ^a	960,700	459,179	311,785	1,944,164		.527358		
9842 ^b	31,512	16,284	9,358	63,382		.017192		
9845 ^c	9,570	4,782	2,790	19,042		.005165		
9888 ^d	612,430	324,255	182,120	1,243,455		.337290		
9899 ^e	227,088	111,960	37,597	416,567		.112995		
Value of Output	1,841,300	916,460	543,650	3,686,610	1.000000	1.000000		
$\frac{\sum MI_{A+B}}{\sum MI_A} = \frac{\sum output_{A+B}}{\sum output_A} = 1.005410$								

a Sum of Material Inputs
b Transport Inputs
c Heat, Light, and Power

d Payroll (Wages & Salaries)
e Residual

APPENDIX B - 3

THE COMPUTATIONS OF INPUT-OUTPUT COEFFICIENTS

The following example of a typical work sheet of a manufacturing industry illustrates the computational procedure used to derive the input output coefficients. The industry data in the example consist of three A-type, complete returns, and one B-type, partially complete return. See text of Chapter 2 on the use of A- and B-type questionnaires in the computational procedure.

This example is based on actual data from three returns. The material input codes, however, have been changed in order to avoid disclosing confidential information. The data for the other establishments are fictitious and were added in order to illustrate the procedure more effectively.

ESTIMATES OF THE MIX OF CONTRACTING, MANUFACTURING AND JOBBING
WITHIN THE APPAREL INDUSTRIES

Many of the Apparel 4-digit SIC Industries, in major group SIC 23, are characterized by a mixture of contractors, jobbers and manufacturers. Frequently, the mix of contracting, jobbing and manufacturing firms in our sample differed from the mix for the region and from the mix for the nation reported in the 1958 U.S. Census of Manufacturers. Because the production structure, and hence the input-output coefficients tend to differ significantly among these three subindustries within the same 4-digit SIC Industry, the validity of regional coefficients obtained from a particular sample of firms depends heavily on the extent to which the sampled mix of contractors-jobbers-manufacturers represents that of the region.

In order to avoid the improper aggregation of sub-industries, it was necessary to obtain regional estimates on the mix of these subgroups within each 4-digit SIC Industry wherever applicable. In the derivation of the estimates the primary concern was with the identification of employment in contracting establishments. Jobbers were included with the manufacturers since (1) they were considered by knowledgeable persons in the industry to represent generally a small fraction of total industry employment and (2) they could not be successfully identified in a consistent manner for most 4-digit apparel industries.

The estimates were obtained from trade associations, knowledgeable persons in the industry ⁽¹⁾, and from a special phone survey of non-responding and non-sampled establishments.

(1) The assistance rendered by the following persons is gratefully acknowledged: Mr. A. Smith of Mens' Outerwear Manufacturers Association; Mr. Savitt of the Women's and Children's Outerwear Contractors Association; Mr. H. Berg of True Form Corsets, and Dr. Chills of the Wharton School for his estimates for establishments associated with the Knitted Outerwear Manufacturers Association.

Similar estimates were obtained for a few 4-digit SIC Textile Industries where the sub-industry mix problem was evident. The following tabulation presents the percent distribution of the estimated employment in these sectors.

SIC Industry	RIS <u>Regional Estimates</u>		<u>RIS Survey</u>	
	Mfg. Contractors & Finishers		Mfg.	Contractors
2251	83%	17%	93%	7%
2252	100	-	100	-
2253	75 ⁽¹⁾	25	97	3
2254	100	-	100	-

(1)

Corresponding estimates for 1965 indicate that employment in manufacturing establishments consisted of 80% of total. The industry data were adjusted to the estimated mix for 1965.

The following table presents the industry mix of contractors and manufacturers (including jobbers) in terms of industry employment.

COMPARISON OF EMPLOYMENT IN CONTRACTING AND MANUFACTURING
ESTABLISHMENTS, THE APPAREL INDUSTRY IN: THE NATION, THE
REGION AND RIS SURVEY REPORTING ESTABLISHMENTS

SIC Industry	Nation (1958 Census)		RIS Regional Est. (1959)		Source of Est.	RIS Survey 1959	
	Mfg. ^a	Cont.	Mfg. ^a	Cont.		Mfg. ^a	Cont.
2311	60	40	80 ^b	20	1	87	13
2321	50	50	95	5	1	100	-
2322	82	18	n.a.			67	33
2323	82	18	n.a.			100	-
2327	50	50	40	60	1	6	94
2328	74	26	95	5	1	100	-
2329	62	38	33	67	1	40	60
2331	27	73	50	50	1	40	60
2335	40	60	33	67	1	72	28
2337	47	53	90	10	1	73	27
2339	61	39	67	33	2	-	100
2341	66	34	n.a.			100	-
2342	72	28	100	-	2	n.a.	
2361	45	55	76 ^c	24	1	92	8
2363	51	49	90	10	1	100	-
2369	67	33	100	-	2	100	-
2381	95	5	n.a.			n.a.	
2384	61	39	85	15	2	29	71
2385	70	30	-	100	2	-	100
2386	82	18	100	-	2	100	-
2387	86	14	75	25	2	40	60
2389	88	12	n.a.			100	-
2391	n.a.		85	15	2	75	25

n.a. Not Available

^aJobbers were included with the manufacturers.

^bIncluding 3.5% jobbers

^cIncluding 2% Jobbers

Source of RIS Estimate

1. Manufacturers' associations
2. Knowledgeable persons in the industry and sampled phone calls to firms in industry.

APPENDIX B - 5

AGGREGATED MANUFACTURING SECTORS

This Appendix lists the manufacturing sectors consisting of more than one 4-digit SIC Industry. For the 4-digit SIC Industries comprising the aggregates, data on available questionnaires and industry control estimates are given in order to indicate the extent to which a sector's technical coefficients represent (1) the respective industries and (2) the industry mix in the aggregate.

In most of the cases where no survey returns were obtained, the respective industries represent small industries whose special survey problems were noted in the text. These small industries, without survey data, were aggregated with the residual category at a 3- and 2-digit SIC level. In most cases, except Sectors 3510 and 3590, no statistical establishments were added to represent the small industries since:

(1) no satisfactory secondary data were available, otherwise they would not have been aggregated, and (2) they represent a small fraction of the aggregate.⁽¹⁾

Different aggregation policy was applicable to Sectors 2020 and 2870. Sector 2020 is a result of non-disclosure requirements; it was hoped that subsequent arrival of late returns would have permitted the disaggregation of SIC 2021 and 2022. Because of the difficulty in classifying the returns in Sector 2870 and the resulting difficulty in estimating controls for the two industries comprising this sector, the industries were combined.

⁽¹⁾ The small industries in Sectors 3510 and 3590 were not originally intended to be aggregated. However, because of non-response in SIC 3519 and a downward revision of SIC 3532 control estimates, SIC 3519 and SIC 3532 were later aggregated into their respective sectors.

APPENDIX TABLE B-5
AGGREGATED MANUFACTURING SECTORS

Aggregated Sector and 4-digit SIC Code	Edited Questionnaires						1959 Regional Control Estimates ^a	
	Complete		Partially Complete				Estab. Empl.	
	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.
<u>2020</u>							4	<u>133</u>
<u>2021</u>	1	42	1	3	2	45	2	<u>78</u>
2022	1	46	-	-	1	46	2	55
<u>2090</u>	-	-	-	-	-	-	<u>44</u>	<u>988</u>
<u>2025</u>	-	-	-	-	-	-	<u>2</u>	<u>13</u>
2093	-	-	-	-	-	-	1	21
2098	-	-	-	-	-	-	4	105
2099	3	237	-	-	3	237	37	849
<u>2490</u>							<u>73</u>	<u>820</u>
<u>2411</u>							<u>14</u>	<u>40</u>
2442							2	59
2491							3	120
2499	4	182	2	80	6	262	54	601
<u>2640</u>							<u>44</u>	<u>3007</u>
<u>2644</u>	-	-	-	-	-	-	<u>4</u>	<u>89</u>
2649	2	239	1	65	3	304	40	2918
<u>2830</u>							<u>61</u>	<u>7289</u>
<u>2831</u>	1	7	-	-	1	7	<u>4</u>	<u>39</u>
2834	3	1255	2	2499	5	5854	57	7250
<u>2870</u>							<u>6</u>	<u>541</u>
<u>2873</u>							<u>6</u>	<u>541</u>
2879	2	14	-	-	2	14	6	541
<u>3330</u>							<u>4</u>	<u>85</u>
<u>3331</u>	-	-	-	-	-	-	<u>1</u>	<u>50</u>
3339	2	21	-	-	2	-	3	35
<u>3390</u>							<u>21</u>	<u>727</u>
<u>3392</u>	-	-	-	-	-	-	<u>2</u>	<u>47</u>
3399	3	563	-	-	3	563	19	680

APPENDIX TABLE B-5 (Continued)

AGGREGATED MANUFACTURING SECTORS

Aggregated Sector and 4-digit SIC Code	Edited Questionnaires						1959 Regional Control Estimates ^a	
	Complete		Partially Complete		Total		Estab.	Empl.
	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.
<u>3510</u>							5	9440
<u>3511</u>	1	7630	-	-	1	7630	2	9365 ^b
<u>3519</u>	-	-	-	-	-	-	3	75 ^g
<u>3590</u>	-	-	-	-	-	-	6	819
<u>3532</u>	-	-	-	-	-	-	1	1 ^g
<u>3599</u>	2	97	1	85	3	182	5	818
<u>3690</u>							9	831
<u>3641</u>	-	-	-	-	-	-	1	1
<u>3699</u>	-	-	-	-	-	-	8	830 ^g
<u>3990</u>							82	1152
<u>3851</u>	-	-	1	6	1	6	7	50
<u>3912</u>	-	-	-	-	-	-	3	20
<u>3963</u>	-	-	-	-	-	-	2	22
<u>3999</u>	3	189	2	225	5	414	70	1070

^a See Appendix B-2 for survey coverage data.

^b Statistical establishment added, 10 - 25 percent of industry data.

^g Statistical industry constructed, 100 percent of industry data.

APPENDIX B - 6

ESTIMATED 1959 EMPLOYMENT OF THE CONSTRUCTION INDUSTRIES, PHILADELPHIA, PA. - N.J. SMSA

Sector Code	(1) Employment First Quarter 1959	(2) Seasonal Adjustment Coefficient	(3) Average Annual Employment (1)x(2)
1511	14,649	1.142777	16,741
1611	3,376	1.486938	5,020
1621	6,406	1.145327	7,337
1711	8,115	1.086301	8,767
1731	3,559	1.039725	3,700
172	3,017	1.388979	4,191
174	7,596	1.159746	8,809
175	2,936	1.240736	3,643
176	2,074	1.181439	2,450
177	1,420	1.194058	1,696
178	37	1.082645	40
179	5,426	1.161902	6,304
1701 ^a	22,506		27,133
Total	58,611	1.172088	68,698

^aSector 1701 consists of SIC 172, 174 to 179.

Sources:

- Col. 1/ U.S. Bureau of the Census and U.S. Bureau of Old-Age Survivors Insurance, County Business Patterns, First Quarter 1959, Parts A and 3B, U.S. Gov't Printing Office, Washington, D.C., 1961.
- Col. 2/ Average Annual March employment obtained from Commonwealth of Pennsylvania, Dept. of Labor and Industry, Employment and Wages of Workers covered by the Pennsylvania Unemployment Compensation Law, 1959, statistical information Bulletin No. 137, (Harrisburg, Bureau of Employment Security, November, (1960), Table 2.

APPENDIX B-7

ESTIMATED NUMBER OF MANUFACTURING ESTABLISHMENTS, EMPLOYMENT
AND VALUE OF SHIPMENTS, PHILADELPHIA, PA. - N.J. SMSA, 1959

The estimates of employment and value of shipments were coded in accordance with the estimation procedures described in Chapter IV in this text.

Employment estimates were coded as follows:

A - standard estimation procedures

B1a to B1c - Estimation procedures based on both 1958 U.S. census benchmark data and corrected DIA ratios. The nature of the correction and use of DIA data is indicated by the last letter in the code, a, b, or c. See text for explanation.

B2a to B2c - Estimates based on both 1959 DIA benchmark and 1958 census ratio are coded by B2a. Estimates based on 1958 census data for the New Jersey part of the SMSA are coded by B2b. RIS 1959 estimates for the New Jersey part of the SMSA are coded by B2c. See text

B3 - Estimates derived from both 1958 census and 1960 DIA combined count of establishments by employment size and by county, together with RIS survey data for 1959. See text

B3a - Partial counts of establishments based on RIS data applicable mostly to small industries with reclassified survey returns. See text

Value of shipments estimates were coded according to the following source of the value of shipment per employee ratios used:

- a. RIS survey
- b. DIA 1959 data
- c. Disaggregated DIA data where disaggregation was on the basis of 1958 national census shipments per employee ratios
- d. National 1958 U.S. Census data
- e. Combination of the above sources

ESTIMATED NUMBER OF MANUFACTURING ESTABLISHMENTS,
EMPLOYMENT AND VALUE OF SHIPMENTS,
IN 1959, PHILADELPHIA SMSA

SIC Ccode	Establishments	Employment	Source	Value of Shipments	Source
Total Mfg.	7,997	560,603		\$11,459,364,923	
<u>20</u>	<u>771</u>	<u>52,664</u>		<u>1,479,886,564</u>	
2011	65	3,842	B3	207,106,852	a
2013	60	2,507	A	89,790,712	a
2015	11	315	B3	9,012,150	a
2021	2	78	B3	3,976,050	c
2022	2	55	B3	1,706,375	a
2024	17	1,961	A	51,833,152	a
2025	2	13	B3	593,840	c
2026	88	7,093	B3	185,276,253	c
2031	2	80	B3	1,443,600	c
2032	3	4,614	B1a	155,653,290	a
2033	31	1,807	B3	32,849,453	c
2035	19	363	B1b	7,495,587	b
2036	7	230	A	9,638,380	a
2037	12	717	A	14,340,000	a
2041	2	14	B3	1,008,854	c
2042	26	568	B1a	30,853,760	c
2043	1	78	B1b	3,047,772	c
2045	2	14	B2b	633,696	c
2046	2	20	A	624,000	b
2051	163	10,726	B1a	155,655,712	b
2052	20	2,854	A	61,195,468	a
2062	2	1,991		120,813,880	
2071	71	3,931	B1a	54,845,312	b
2072	4	608	B1b	17,363,872	b
2073	3	579	B1b	18,050,325	c
2082	6	1,812	A	49,911,540	b
2084	2	95	B3	2,546,380	a
2085	8	1,388	A	47,570,924	b
2086	47	1,838	A	35,943,928	b
2087	19	644	B1a	28,798,392	a

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
2093	1	21	B3	2,761,563	c
2094	12	562	B2b	23,887,810	b
2095	2	45	B3	1,250,000	a
2096	1	58	B3a	7,220,536	e
2097	15	189	B1a	1,952,557	b
2098	4	105	B2b	2,654,085	b
2099	37	849	B3a	40,580,502	c
<u>21</u>	<u>20</u>	<u>4,408</u>		<u>68,648,081</u>	
<u>22</u>	<u>490</u>	<u>37,125</u>		<u>536,347,625</u>	
2211	17	1,187	A	15,940,223	b
2221	13	1,115	B2b	20,325,335	b
2231	32	2,944	A	46,164,864	b
2241	35	1,698	B2b	20,623,908	b
2251	66	1,331	B1b	10,516,231	b
2252	33	1,461	B2b	11,958,285	b
2253	80	9,964	B1a	111,327,772	b
2254	11	1,725	B3	28,778,175	b
2256	22	1,353	A	23,635,557	b
2259	6	310	B3	3,933,280	b
2261	14	1,091	B3	12,893,438	b
2262	3	89	B2b	1,012,553	b
2269	24	1,693	B2b	19,926,610	b
2271	10	1,931	B2b	39,207,024	b
2272	5	892	B2b	24,465,776	b
2279	11	327	B2b	3,106,827	b
2281	5	251	B3	4,624,173	b
2282	19	1,418	B3	18,283,692	a
2283	21	2,269	B2b	41,776,828	b
2284	5	260	B2b	3,935,880	b
2291	6	444	B2b	11,500,488	b
2292	7	743	A	5,863,756	b
2293	12	452	B1b	8,462,916	b
2294	11	180	A	2,380,500	b
2295	2	12	B2b	199,800	c
2297	10	1,071	A	35,455,455	b
2298	3	357	B3a	3,727,252	c
2299	7	537	B1a	6,321,027	c
<u>23</u>	<u>1,008</u>	<u>58,310</u>		<u>579,581,748</u>	
2311	144	18,106	B1a	221,128,578	b

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
2321	18	1,213	A	12,400,499	b
2322	3	45	B3	478,575	a
2323	20	411	Bla	3,825,999	b
2327	55	2,977	A	18,448,469	b
2328	20	919	B1b	9,883,441	a
2329	41	2,597	B1b	15,143,107	b
2331	46	2,853	Bla	27,283,239	d
2335	134	6,842	A	57,477,800	b
2337	52	2,147	A	16,132,558	b
2339	44	2,558	A	24,848,412	b
2341	19	1,233	B3a	11,621,025	b
2342	7	196	B2b	2,887,200	b
2351	16	473	B3	3,233,428	b
2352	20	2,020	A	15,832,760	b
2361	42	4,086	A	31,466,000	b
2363	21	1,064	A	9,468,536	b
2369	37	992	A	7,462,816	b
2371	15	79	A	1,443,883	b
2381	1	47	A	391,828	d
2384	6	266	B3	3,336,970	b
2385	3	228	B3	880,080	b
2386	1	163	A	1,959,423	a
2387	14	753	B2b	7,805,598	b
2389	15	410	B3a	4,643,250	b
2391	36	880	A	14,711,840	b
2392	43	1,009	B3	14,631,509	b
2393	6	248	B3	4,845,334	e
2394	29	347	B3	4,315,292	b
2395	35	464	Bla	3,267,024	b
2396	25	1,167	A	15,544,440	b
2397	5	192	B1b	1,038,336	e
2399	35	1,325	B3	11,739,500	b
<u>24</u>	<u>199</u>	<u>3,178</u>		<u>53,042,064</u>	
2411	14	40	B1c	452,120	c
2421	35	158	A	1,672,114	b
2431	61	1,187	B1b	19,335,043	b
2433	6	405	Bla	14,137,335	e

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
2441	17	457	B2b	5,858,740	b
2442	2	59	B1c	588,289	d
2443	4	105	B2b	721,770	a
2445	3	46	B2b	1,035,500	b
2491	3	120	B3	2,287,800	c
2499	54	601	B3	6,943,353	c
<u>25</u>	<u>267</u>	<u>7,159</u>		<u>114,838,710</u>	
2511	36	594	B1b	6,297,588	b
2512	56	773	B2a	9,290,687	b
2514	25	1,773	B1a	34,731,297	b
2515	32	684	B2a	12,682,728	b
2519	3	249	B3	5,734,768	b
2521	6	208	B2b	2,163,000	b
2522	13	881	B1a	15,051,004	b
2531	8	259	B2b	3,790,724	b
2541	40	718	B3	8,630,360	b
2542	20	731	B3	11,787,375	b
2591	16	167	A	2,719,929	b
2599	12	122	B3	1,959,250	e
<u>26</u>	<u>233</u>	<u>21,892</u>		<u>530,256,174</u>	
2621	11	3,867	B3	136,099,065	a
2631	11	2,945	B3	74,835,395	b
2641	18	1,199	B1a	47,944,315	e
2642	8	661	B1a	9,841,265	e
2643	10	847	A2	23,012,990	b
2644	4	89	B3	1,261,575	b
2645	15	554	B2b	6,045,802	b
2649	40	2,918	B1a	52,071,710	c
2651	30	2,351	A2	41,742,005	b
2652	34	1,480	A2	13,861,680	b
2653	33	3,997	A3	98,406,140	a
2654	5	416	B3	15,092,480	a
2655	13	459	A	7,861,752	b
2661	1	109	B3a	2,180,000	e
<u>27</u>	<u>997</u>	<u>41,104</u>		<u>689,303,310</u>	
2711	107	8,306	B3	141,368,120	a

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
2721	37	12,350	B3	258,757,200	a
2731	28	1,856	B3	43,200,456	b
2732	37	888	B3	18,063,520	e
2741	35	393	B3	4,400,814	b
2751	415	6,412	B3	83,945,904	b
2752	136	4,250	B3	63,805,250	a
2753	17	714	A	6,278,202	b
2761	25	962	B3	15,381,418	b
2771	8	309	A	3,011,205	b
2782	19	435	B3	11,383,950	b
2789	46	1,485	A	10,105,425	b
2791	46	1,430	Bla	13,885,300	b
2793	30	904	Bla	11,243,048	b
2794	9	370	B3	3,877,970	b
2799	2	40	B3a	595,520	b
<u>28</u>	<u>422</u>	<u>33,955</u>		<u>1,290,930,537</u>	
2813	18	734	Bla	29,475,972	b
2814	4	1,029	B3	37,795,170	b
2815	4	205	B3	7,996,025	c
2816	6	599	Bla	26,483,587	a
2818	7	1,107	B3	35,966,430	b
2819	30	3,868	B3	167,936,956	a
2821	25	9,335	B3	260,325,145	a
2831	4	39	B3	858,585	c
2834	57	7,250	B3	436,609,500	a
2841	26	1,204	Bla	58,507,576	a
2842	37	787	B2b	20,245,575	b
2843	15	362	B1b	11,771,878	a
2844	19	237	A	3,764,271	a
2851	68	3,658	Bla	98,520,914	b
2852	3	84	A	1,630,524	b
2861	1	3		69,120	c

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
2871	4	324	B3	7,290,000	b
2873					
2879	6	541	A	17,713,422	b
2891	18	517	B1a	13,756,704	a
2892	1	25	B3	471,350	a
2893	21	714	B1a	18,365,508	b
2894	2	157	B3	4,709,806	a
2895	1	5	B3	172,155	c
2899	45	1,171	B1a	30,544,364	c
<u>29</u>	<u>51</u>	<u>15,802</u>		<u>1,018,325,831</u>	
2911	12	13,833	A	973,110,051	a
2951	17	200	B3	6,734,200	b
2952	4	79	B3	2,569,080	b
2992	18	1,690	B3	35,912,500	b
<u>30</u>	<u>151</u>	<u>12,773</u>		<u>326,686,852</u>	
3011	3	5,323	B2b	206,654,829	a
3021	1	174	B3	1,949,322	a
3031	1	36	B3	711,972	a
3069	40	3,443	A	68,894,430	a
3079	106	3,797	B1a	48,476,299	a
<u>31</u>	<u>108</u>	<u>6,352</u>		<u>87,840,080</u>	
3111	21	2,200	B3	45,810,600	b
3121	6	313	B1a	5,557,132	c
3131	8	251	B3	3,121,350	c
3141	16	1,802	A	16,696,736	b
3142	5	251	B3	2,484,900	c
3161	26	448	B3	4,164,160	b
3171	8	538	A	3,864,454	b
3172	8	410	A	4,566,990	b
3199	10	139	B1b	1,574,758	c
<u>32</u>	<u>326</u>	<u>14,507</u>		<u>281,704,211</u>	

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
3211	1	155	B3	2,505,835	a
3221	3	282	A	4,257,072	a
3229	7	114	B3	1,090,524	b
3231	46	1,152	B1a	23,930,490	a
3241	1	192	B2c	4,200,000	b
3251	5	209	A	2,738,945	a
3253	4	1,415	B3	18,188,410	a
3255	5	329	B3	5,381,828	e
3259	4	237	B2b	3,799,347	a
3261	1	249	B2c	3,671,505	d
3269	15	240	B3	2,799,840	b
3271	32	480	B1a	8,814,720	b
3272	46	834	B3	13,574,015	e
3273	51	1,359	B1a	38,674,422	b
3274	1	310	B3a	8,500,000	e
3275	3	410	B3	16,939,560	a
3281	20	262	B3	3,748,434	b
3291	19	1,406	B1a	24,010,262	b
3292	7	1,478	B3	21,357,100	a
3293	21	1,589	B3	25,106,200	b
3295	13	377	B1a	9,880,039	a
3296	2	575	B3	20,107,750	a
3297	8	674	B3	16,240,841	e
3299	11	179	A2	2,187,022	c
<u>33</u>	<u>203</u>	<u>37,032</u>		<u>794,653,584</u>	
3312	11	19,604	B3	470,025,504	a
3315	6	476	B3	17,506,328	b
3316	3	392	B3	13,500,872	b
3317	10	1,395	A2	45,976,419	b
3321	33	3,916	A	40,569,760	a
3323	10	2,164	A	27,565,032	a
3331	1	50	B2c	1,172,100	d
3333	1	4	B3	93,608	d
3334	2	73	B2b	3,327,055	d
3339	3	35	B3	976,920	a
3341	22	1,160	A	51,317,060	e

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
3351	4	470	B3	13,244,600	a
3352	5	223	A	4,037,638	a
3356	5	1,545	B3	21,562,000	a
3357	3	200	B3	5,637,000	b
3361	21	1,720	B1a	26,448,440	b
3362	25	482	B1a	6,961,044	b
3369	9	799	B2b	9,761,383	b
3391	8	1,597	A2	21,176,220	b
3392	2	47	B2b	814,416	c
3399	19	680	B3a	12,910,044	e
<u>34</u>	<u>932</u>	<u>43,807</u>		<u>764,647,540</u>	
3411	9	2,984	A	87,956,384	b
3421	3	72	A	959,040	a
3423	30	1,200	B3	16,213,200	b
3425	2	408	B3	4,896,000	a
3429	37	1,140	B3	20,960,040	a
3431	3	331	B2b	5,200,850	e
3432	9	160	B3	1,626,240	c
3433	31	2,471	B1a	47,967,052	a
3441	61	4,454	B3a	82,033,772	b
3442	61	2,338	B1a	39,325,160	b
3443	46	3,542	B3	71,130,444	b
3444	158	3,588	B1a	53,044,992	b
3449	82	987	A	18,905,959	a
3451	50	674	B2c	7,980,160	b
3452	23	4,400	B1a	75,002,400	a
3461	78	4,890	B3	89,286,463	e
3471	56	783	B1a	7,130,781	b
3479	28	591	B1a	7,697,910	b
3481	60	1,785	B1a	23,562,000	b
3491	9	678	B3	16,696,899	e
3493	10	1,783	B2c	20,443,878	b
3494	39	2,974	B2c	43,354,972	b
3496	1	374	B1a	3,500,640	e
3497	2	186	B2c	4,311,852	c
3498	11	414	B3	6,755,652	a
3499	33	600	B1a	9,304,800	a

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
<u>32</u>	<u>790</u>	<u>47,927</u>		<u>767,659,299</u>	
3511	2	9,365	A	177,026,595	a
3519	3	75	F2b	977,325	b
3522	12	377	B3	4,851,613	b
3531	4	132	B3	2,476,848	a
3532	1	1	B3	17,425	c
3534	6	381	A	6,223,254	b
3535	12	870	B3	16,001,764	e
3536	6	153	B3	1,959,624	b
3537	9	2,903	A	52,991,362	a
3541	20	607	B3	6,687,926	b
3542	10	135	B3	1,611,495	b
3544	183	1,942	B1a	22,810,732	b
3545	14	124	B2c	1,557,936	b
3548	6	41	B2c	673,671	c
3551	19	1,148	B3	14,824,124	a
3552	40	2,910	B1a	41,534,430	b
3553	5	73	B3	1,161,941	c
3554	22	1,905	D	31,851,600	a
3555	22	1,006	B3	12,231,954	b
3559	35	2,280	A	39,795,120	a
3561	20	1,018	A	15,358,566	b
3562	10	4,728	B3	76,730,712	b
3564	5	39	B2c	1,599,819	
3565	36	246	B3	2,448,930	b
3566	19	2,621	B1a	43,314,646	b
3567	11	784	B1a	14,881,888	b
3569	18	1,811	A	33,691,844	a
3571	7	3,040	B3	33,196,800	b
3576	5	103	A	1,044,317	b
3579	5	239	B3	3,075,930	a
3581	4	254	B3	6,517,894	a
3582	1	3	B2b	55,698	c
3585	25	2,181	B3	41,242,710	b
3586	6	386	B2b	7,269,538	b
3589	10	512	B2b	10,888,704	c
3591	172	2,716	B2b	27,545,672	b
3599	5	818	B3	11,528,892	b
<u>36</u>	<u>329</u>	<u>56,434</u>		<u>1,020,940,614</u>	

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
3611	38	1,130	B3	14,251,480	e
3612	9	444	B3	4,435,116	a
3613	21	9,130	B3	165,947,250	b
3621	11	1,512	B1c	22,509,144	b
3622	5	105	A	1,927,065	a
3623	4	457	B3	18,774,931	b
3624	3	19	B2b	253,954	b
3629	8	534	B2b	9,273,978	b
3631	1	4	B2b	57,148	c
3633	3	50	B2b	1,229,000	b
3634	7	287	B1a	7,275,450	b
3635	1	10	B1a	189,390	c
3639	7	487	B3	8,966,644	c
3641	1	1	B2b	15,342	a
3642	75	3,849	B1a	59,051,358	b
3643	14	550	B1c	6,788,650	b
3644	19	1,702	B2b	41,052,240	b
3651	7	3,462	B3	72,265,788	b
3652	5	178	B1a	2,712,008	b
3661	2	23	B3	399,779	a
3662	17	22,038	B3	466,720,764	a
3671	3	2,837	B2b	23,799,593	b
3672	4	118	B3	2,025,706	a
3679	43	4,783	B3	59,706,284	e
3691	5	1,374	A	22,111,782	b
3693	3	60	B3	2,182,000	a
3694	5	460	B3	4,270,640	a
3699	8	830	B2b	2,748,130	c
<u>37</u>	<u>108</u>	<u>42,113</u>		<u>733,081,663</u>	
3711	3	2,104	B3	92,866,352	a
3713	19	283	B3	3,307,987	b
3714	19	11,797	B3	215,059,310	b
3715	3	851	A	34,482,520	b
3721	4	2,506	B3	40,574,763	a
3722	6	1,540	B3	25,400,235	e
3729	25	7,454	B3a	124,442,254	e

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
3731	9	13,850	B3	164,771,996	e
3732	11	127	A	1,646,936	b
3741	1	1,426	B3a	27,259,040	a
3791	2	60	B3	1,330,680	c
3799	6	115	B1b	1,939,590	c
<u>38</u>	<u>156</u>	<u>13,692</u>		<u>165,949,868</u>	
3811	24	939	B1b	10,297,074	a
3821	39	10,431	A	128,019,663	a
3822	5	132	B3	1,588,356	c
3831	8	186	B2a	2,981,766	a
3841	10	219	A	2,642,235	a
3842	22	531	B1b	7,175,934	a
3843	21	900	B1a	8,845,200	a
3851	7	50	B3	794,200	c
3861	20	304	A	3,605,440	c
<u>39</u>	<u>436</u>	<u>10,369</u>		<u>155,130,578</u>	
3911	45	282	A	4,676,688	c
3912	3	20	A	301,620	c
3913	6	8	B3a	202,704	b
3914	6	68	B1a	1,003,544	a
3931	4	429	A	7,339,761	b
3941	25	1,040	A	13,148,720	b
3942	8	308	B1c	2,224,376	b
3949	27	885	B1a	12,699,750	b
3951	2	556	B3	6,755,956	c
3952	4	195	A	2,596,035	c
3953	27	370	A	3,145,370	b
3955	8	233	B3	3,825,860	a

SIC Code	Establishments	Employment	Source	Value of Shipments	Source
3961	7	78	B3	853,866	b
3962	11	325	B3	4,639,375	b
3963	2	22	A	286,220	c
3964	4	227	B1c	3,054,512	b
3981	25	463	A	6,592,651	b
3982	3	977	A	25,006,053	e
3984	2	191	B2	3,144,624	c
3987	33	520	B1a	3,104,400	b
3988	17	289	A	3,645,446	b
3992	2	16	B3	101,008	a
3993	90	1,458	B1a	19,489,086	b
3995	5	339	A	2,852,007	b
3999	70	1,070	A	24,440,940	c

APPENDIX C

ESTIMATES OF ANNUAL EMPLOYMENT AND PAYROLL: NON-MANUFACTURING

This appendix presents material developed in
the corresponding RIS Memoranda as noted in the text.

APPENDIX C

ESTIMATES OF DETAILED ANNUAL
EMPLOYMENT & PAYROLL: NON-MANUFACTURING

Object: This Appendix outlines the procedures used in deriving estimates of annual average employment and annual payroll for 1959 by three and four-digit SIC's within Divisions E (Transportation, Communications, Electricity, Gas, and Sanitary Services) G (Finance, Insurance, and Real Estate), and H (Services). These estimates were based upon the data in County Business Patterns, First Quarter 1959, Parts 3A and 3B, U.S.

Bureau of the Census and U.S. Bureau of Old-Age and Survivors Insurance, U.S. Government Printing Office, Washington, D.C., 1961.

Methodology:

A. DETAILED ESTIMATION OF FIRST QUARTER EMPLOYMENT.

On the basis of the published data, estimates were made of the reported employment by county for the SIC level (2, 3, or 4-digit) as required by the relevant sector. When figures were missing, employment was generally taken as the median of the size class noted. "Unallocated" categories, designated as unspecified employment within the classification, were subsequently distributed on the basis of the available data and staff judgment.

B. ANNUAL AVERAGE EMPLOYMENT

The detailed first quarter employment estimates reflecting employment for the pay period ending nearest March 15, 1959, were adjusted to yield annual average employment. This adjustment was based upon the seasonal factors in the employment by industry reported for the State of

Pennsylvania as a whole. Each adjustment factor, (March Employment)/(Annual Average Employment), was calculated from: Employment and Wages of Workers Covered by the Pennsylvania Unemployment Compensation Law, 1959. Statistical Bulletin 137. Pennsylvania Department of Labor and Industry (November 1960). Table 2.

C. ESTIMATED ANNUAL PAYROLL

With the same procedures used in allocating employment, 1st quarter Taxable Payroll was estimated by county for each required SIC level. This First Quarter Payroll was adjusted to yield the total annual payroll as follows:

$$(\text{1st qtr payroll}) \times (4) \div (\text{Seasonal adjustment factor}) = \text{total annual payroll.}$$

TABLE C - 1 - 1

ECONOMIC DIVISION E

TRANSPORTATION, COMMUNICATION, ELECTRIC,
GAS, AND SANITARY SERVICESEmployment

SIC	Published (1)	Allocated (2)	Seasonal Adjustment (3)	Estimated Annual Average (4) = (2)/(3)
41	11,449	11,449	-	11,179
411	9,140	9,147	-	8,984
4111	8,997	8,997	1.018062	8,837
4119	143	150	1.018062	147
412	1,413	1,433	1.040701	1,377
413	112	149	.970859	153
414-417		157	.943368	166
415	219	439	1.159555	379
Unalloc	565	124	1.032510	120
42	20,882	20,882	-	21,704
421	18,490	18,490	.963305	19,194
422	1,725	1,816	.989420	1,835
423	448	481	.833333	577
Unalloc	219	95	.964671	98
44	7,814	7,969	1.080991	7,372
45	1,129	1,174	.975026	1,204
46	210	219	.939450	233
47	1,226	1,276	1.037274	1,230
48	24,186	24,186	-	24,016
481	16,968	16,968	1.000353	16,962
482	5,844	5,906	1.026972	5,751
483	1,246	1,266	1.007435	1,257
489	2	12	.978903	12
Unalloc	126	34	1.001585	34
49	15,581	15,581	-	15,800
491	7,528	7,528	.996436	7,555
492	4,866	4,866	.979639	4,967
493	1,465	1,465	.971851	1,507
494	621	621	.957653	648
495	432	552	.974843	566
496	15	15	1.023333	15
497	30	30	.984141	30
Unalloc	669	504	.984141	512
Admin & Aux	496	496	.994958	499
Unalloc	259	0		

TABLE C - 1 - 2

ECONOMIC DIVISION E

TRANSPORTATION, COMMUNICATION, ELECTRIC,
GAS, AND SANITARY SERVICESPayroll

SIC	1st Quarter Published (\$000) (1)	1st Quarter Allocated (\$000) (2)	Estimated Total Annual (\$000) (3) ^a
41	13,270	13,270	51,977
411	11,805	11,809	46,395
4111	11,714	11,714	46,023
4119	91	95	372
412	737	737	2,832
413	153	153	628
414-417	141	141	596
415	329	329	1,136
Unalloc	105	101	390
42	24,637	24,637	102,311
421	22,022	22,022	91,440
422	2,146	2,146	8,674
423	389	389	1,867
Unalloc	80	80	330
44	8,158	8,351	30,903
45	1,492	1,547	6,346
46	360	370	1,574
47	1,322	1,313	5,332
48	29,143	29,143	115,734
481	19,664	19,664	78,635
482	7,177	7,177	27,955
483	2,261	2,261	8,980
489	16	16	64
Unalloc	25	25	100
49	23,759	23,759	96,316
491	11,926	11,926	47,876
492	7,590	7,590	30,989
493	2,140	2,140	8,805
494	776	776	3,239
495	326	417	1,711
496	-	23	92
497	-	46	186
Unalloc	1,001	841	3,416
Admin & Aux	740	740	2,978
Unalloc	319	0	

^aCol 3 - Col (2) x 4 ÷ Seasonal Adjustment. For seasonal adjustment see Col 3, Table C - 1 - 1.

TABLE C - 2 - 1

ECONOMIC DIVISION G

FINANCE, INSURANCE, AND REAL ESTATE

SIC	<u>Employment</u>			
	Published (1)	Allocated (2)	Seasonal Adjustment (3)	Estimated Annual Average (4) = (2)/(3)
60	15,198	15,198	-	15,356
601	-	-	-	-
602	13,565	13,565	.989655	13,707
603	1,380	1,380	.989655	1,394
604	-	-	-	-
605	218	219	.989655	221
Unalloc	35	34	.989655	34
61	6,611	6,611		6,689
612	2,437	2,437	.988407	2,466
61X	4,174	4,174	.988407	4,223
62	3,253	3,253		3,355
621	3,057	3,057	.969533	3,153
622	59	59	.969533	61
623	137	137	.969533	141
63	24,520	24,520	.994635	24,652
64	4,257	4,257	.990328	4,299
65	12,695	12,695		13,191
651	8,800	8,800	.962521	9,143
653	2,353	2,353	.962521	2,445
654	214	231	.962521	240
655	87	94	.962521	98
656	943	1,017	.962521	1,057
Unalloc	298	200	.962521	208
66	2,380	2,380	.989103	2,406
67	334	455	1.013861	449
Admin & Aux	955	955	.986080	968
Unalloc	136	15	.986080	15

TABLE C - 2 - 2

ECONOMIC DIVISION C

FINANCE, INSURANCE, AND REAL ESTATE

Payroll

SIC	1st Quarter Published (\$000) (1)	1st Quarter Allocated (\$000) (2)	Estimated Total Annual (\$000) (3) ^a
60	14,643	14,643	59,184
601	-	-	-
602	13,028	13,028	52,657
603	1,416	1,416	5,723
604	-	-	-
605	165	165	667
Unalloc	34	34	137
61	6,447	6,447	26,090
612	2,141	2,141	8,664
61X	4,306	4,306	17,426
62	5,586	5,586	23,047
621	5,312	5,312	21,916
622	61	61	252
623	213	213	879
63	29,550	29,550	118,838
64	4,801	4,801	19,392
65	11,198	11,198	46,537
651	7,378	7,378	30,661
653	2,123	2,123	8,823
654	170	183	761
655	82	88	366
656	1,082	1,167	4,850
Unalloc	363	259	1,076
66	2,075	2,075	8,391
67	303	407	1,606
Admin & Aux	880	1,091	4,426
Unalloc	382	17	69

^aCol. 3 = Col. 2 (2) X 4 : Seasonal Adjustment. For Seasonal Adjustment see Col. 3, Table C - 2 - 1.

TABLE C - 3 - 1

Economic Division H

Employment

SIC	Published	Allocated	Seasonal Adjustment	Estimated Annual Average
70	6,913	6,913	.865027	7,992
72	23,204	23,204	.990945	23,416
73	17,643	17,643	-	18,139
736	669	783	.972652	805
739	8,141	8,141	.972652	8,370
7392	951	1,151	.972652	1,183
739X	6,892	6,892	.972652	7,086
Unalloc	98	98	.972652	101
73X	8,283	8,719	.972652	8,964
Unalloc	550	0		
75	7,172	7,172	.982833	7,297
76	5,630	5,630	-	5,773
769	3,447	3,460	.975242	3,548
7694	576	1,306	.975242	1,339
7699				
769X	2,871	2,154	.975242	2,209
76X	2,132	2,170	.975242	2,225
Unalloc	51	0		
78	3,175	3,377	.982525	3,437
79	6,774	6,774	.854494	7,927
80	41,219	42,727	-	43,916
806	29,609	31,117	.972914	31,983
80X	11,610	11,610	.972914	11,933
81	4,131	4,131	.982405	4,205
82	21,731	21,731	-	20,769
821	6,284	6,284	1.046315	6,006
822	12,985	12,985	1.046315	12,410
82X	2,364	2,462	1.046315	2,353
Unalloc	98	0		
84	343	593	.831169	713
86	22,364	22,364	-	22,625
867	3,999	4,023	.988482	4,070
86X	18,232	18,341	.988482	18,555
Unalloc	133	0		
88	-	-		
89	10,006	10,006	-	10,087
892	947	972	.991973	980
89X	8,798	9,034	.991973	9,107
Unalloc	261	0		
Admin & Aux	287	287	.964210	288
Unalloc	452	0		

TABLE C - 3 - 2

ECONOMIC DIVISION H
SERVICESPayroll

SIC	1st Quarter Published (\$000) (1)	1st Quarter Allocated (\$000) (2)	Estimated Total Annual (\$000) (3) ^a
70	4,197	4,197	19,407
72	17,781	17,781	53,830
73	16,192	16,192	66,578
736	502	502	2,064
739	7,286	7,286	29,963
7392	1,291	1,291	5,309
739X	5,865	5,865	24,120
Unalloc	130	130	535
73X	8,089	8,404	34,551
Unalloc	315	0	-
75	6,522	6,522	26,544
76	6,615	6,615	27,132
769	4,187	4,187	17,173
7694-99	1,861	1,861	7,633
769X	-	2,326	9,540
76X	2,428	2,428	9,959
Unalloc	2,326	0	-
78	1,999	1,999	8,138
79	4,720	4,720	22,095
80	26,707	27,646	113,663
806	18,438	19,377	79,666
80X	8,269	8,269	33,997
81	3,807	3,807	15,501
82	21,096	21,096	80,648
821	4,946	4,946	18,908
822	13,948	13,948	53,322
82X	2,152	2,202	8,418
Unalloc	50	0	-
84	284	535	2,575
86	15,271	15,271	61,796
867	2,844	2,856	11,557
86X	12,363	12,415	50,239
Unalloc	64	0	-
88	-	-	-
89	13,194	13,194	53,203
892	1,061	1,079	4,351
89X	11,916	12,115	48,852
Unalloc	217	0	-
Admin & Aux	465	465	1,929
Unalloc	251	0	-

^a Col 3 = Col (2) X 4 + Seasonal Adjustment. For Seasonal Adjustment see Col 3, Table C - 3 - 1.